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Smart Computing

IN PLAIN ENGLISH

September 1998 Vol. 9 Iss. 9 \$3.95 U.S. \$4.95 Canada

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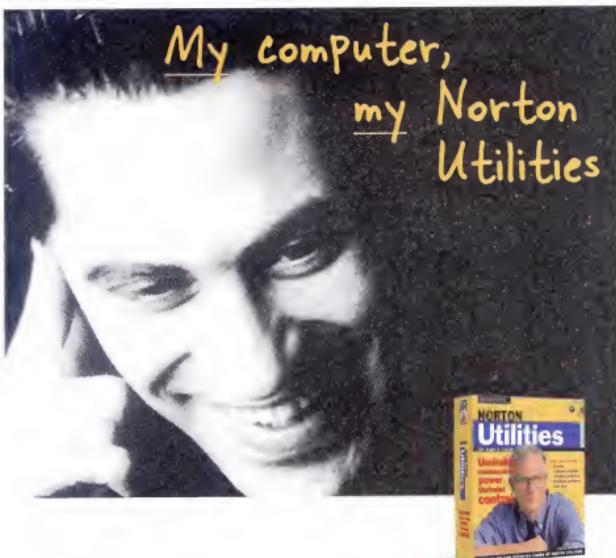
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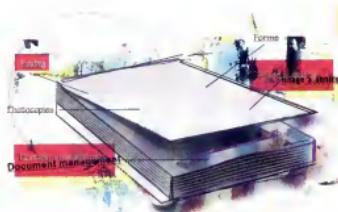
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Corrections/Clarifications:

- The World Wide Web address given for the Windows 95 Service Release on pg. 29 in the August article "Windows 98 For Free?" was missing a character. The correct address is <http://www.microsoft.com/windows/downloads/contents/Updates/W95OSR2/default.asp>.
- The Web address given for the FAT32 testing tool has changed. The new address is <http://www.microsoft.com/windows98/basics/features/fat32.asp?cust>.
- The July article "Upgrading: Diskette Drives" incorrectly stated the price of LS-120 diskettes. The correct price is about \$50 for three diskettes.
- Some readers have been unable to locate the QBASIC programming language, described in the August article "Begin Programming With QBASIC," in Windows 95. It can be found on the Windows 95 CD-ROM by opening the OTHER folder, then the OLD MSDOS folder, then looking for a program file called Qbasic.
- On page 39 in the August article "Voice Recognition Advances," the captions for *ViaVoice* and *NaturallySpeaking* screen shots were reversed.
- In the August article "A Formula For Formulas," the second full paragraph on the last column of page 43 incorrectly states that "Likewise, B52-F52 or B52.F52 could represent the 52nd column in rows B,C, and D." It should read "Likewise, B52-F52 or B52.F52 could represent the 52nd row in columns B,C,D,E, and F."

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Printed in the U.S.A. *Smart Computing* USPS 005-665 (ISSN 1093-4170) is published monthly for \$29 per year by Sandhills Publishing, 131 West Grand Drive, P.O. Box 85380, Lincoln, NE 68501. Subscriber Services: (800) 424-7900. Periodicals postage paid at Lincoln, NE. POSTMASTER: Send address changes to *Smart Computing*, P.O. Box 85380, Lincoln, NE 68501.



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TECHNOLOGY NEWS

Compiled by Joel Strauch



The Crashproof PC

Arrggghh!! For anyone whose computer has crashed in the middle of an important business report or presentation, modern technology offers a glimmer of hope: a computer that continues working even when parts of it fail.

Researchers at the University of California and at Hewlett-Packard Laboratories have built the largest "defect tolerant" computer, named Teramac. Weighing 400 pounds, this computer is about the size of a refrigerator and holds 864 computer chips and about 16,000 wires stretching more than six miles. The machine was loaded with more than 220,000 identified hardware defects, but it worked, and in some cases, using a single, unflawed chip, it outperformed today's high-end computers by 100%.

"The breakthrough is the fact that these guys built a computer with a quarter-million defects in it—any one of which would kill a Pentium chip—and they built it in a way that it can withstand these defects," says Jim Heath, a chemistry professor at UCLA who worked on the project.

But don't look for such a computer to show up on retail shelves any time soon. The Teramac was extremely expensive, even though it was made with throwaway, faulty chips.

The researchers, who describe the project in the June 12 issue of *Science* magazine, say its benefits will come in the future when computer components are made using chemical processes, "transistors out of a beaker," rather than silicon, such as today's Pentium chips. "This is 10 years in the future—not even 10 years before you can buy one, but 10 years before they even exist," says Philip Kuekes, a computer scientist at Hewlett-Packard Labs who worked on the project.

Chemically produced components are microscopically smaller,

faster, and more efficient than today's silicon products made using lithography, the standard process of printing integrated circuits on a board. But the nature of chemical assembly virtually guarantees each product will have flaws. Flaws in the silicon process usually doom a Pentium. Chemically produced components will become practical only when defect tolerant computers become widespread.

If, theoretically, you build a computer chemically, the process would be similar to creating a crystal, leaving you with a fully functional, but inherently defective PC, Heath says. "If you want to make a computer chemically, how do you take a defective crystal and make it work? Teramac tells you how to do that," Heath says.

To bypass faults within Teramac's chips, for example, researchers used a large network of wiring. After the machine was turned on, faulty chips were located and mapped, and its internal brain remembered to bypass the bugs. Whenever a new fault appears, such as a cut wire, the scientists merely remap the system to avoid the new trouble.

Even today, other computers used in life-or-death situations are "fault tolerant," which is subtly different from the Teramac project. For example, machines used for air-traffic control are built with redundancies and even check their decisions by running problems more than once and comparing answers.

"For most people it doesn't make sense to have a computer that is bulletproof," says Nathan Myhrvold, Microsoft Corp.'s chief technology officer. "(But) we're going to see computers increasingly move into areas where people could die if the computer malfunctions, or millions of dollars could be lost, or something else that has enough consequence that it's worthwhile to put the effort into that." ■

Top U.S. Cities For Internet Registration

Network Solutions Inc., the leading registrar of domain names, analyzed the top metropolitan statistical areas (MSAs) for Internet registration in the United States. The analysis shows that the cumulative total of 'Net registrations in commercial (.com), network (.net), and nonprofit or private organization (.org) sites was 1.86 million as of the end of March 1998. Of these, approximately 77%, or 1.43 million, are registrations in the United States. The top 10 MSAs are:

| | |
|---------------------------------|------|
| New York | 9.5% |
| Washington, D.C. | 7.2% |
| Los Angeles—Long Beach | 6.9% |
| San Francisco | 3.6% |
| Boston—Lawrence—Lowell—Brockton | 3.4% |
| San Jose | 2.9% |
| San Diego | 2.2% |
| Dallas | 2.2% |
| Atlanta | 2.1% |
| Oakland | 2.1% |

TECHNOLOGY NEWS

Technology Helps The Blind Work

Carmen Apelgren peers closely at her computer screen as she reviews her outgoing E-mail messages, making sure the grammar is correct. The letters on her specialized word processor are the size of her palm. Her tasks would be impossible without the modification—comparable to a sighted person trying to read an eye chart on the head of a pin.

Apelgren's sight is being destroyed by retinitis pigmentosa, a degenerative eye disease. "It's a pain . . . to be blind," says Apelgren, a spokesperson for the Braille Institute in Los Angeles. "You live your life the best you can, don't whine too much and move on."

It became a little bit easier for the blind to move on, however, about 15 years ago with the advent of computer software specially adapted for the blind. Ironically, though, as computers became more popular and easier for the sighted to use, progress for the blind went into a tailspin. As long as computers dealt with words, the technology was a great emancipator, but as the industry became more graphics-based, with pictures replacing words, new programs meant only blurs to the blind.

"Just by the time we think we have gained the top of the mountain, discovering computers and using them as tools to make our employment and schooling easier, things change to Windows 95 and we start to lose ground," says Betty Bird, senior vice president for rehabilitation programs at New York City's The Lighthouse Inc.

Now that the computer industry has turned its focus to sound-text and other audio programs, the visually impaired are slowly regaining ground so the blind revolution can continue in places such as Los Angeles, New York, Chicago, and other major cities around the country. A printed page placed under the lens of a closed-circuit, color monitor can be magnified tenfold; special programs modify a computer's text size and fonts, so files and E-mail messages are readable; evolving sound equipment gives text a voice, even on the Internet; and Braille-and-speak keyboards allow note-taking in the classroom. ■

Cracking A Window

(From Reuters) It may not seem like much, but developers at a small Seattle software company have found a sliver of computer screen real estate not controlled by giant Microsoft Corp.

Executives of the company hope the space, which amounts to less than half an inch at the bottom of a standard-size screen, provides a wedge that can loosen Microsoft's grip on how computer users access applications and content. The technology, announced recently by tiny Pixel Co., takes advantage of the black



"overscan" space outside the display area of the computer screen to push the Windows Desktop up slightly and insert the slender MySpace interface control bar underneath. The control bar, which will ship beginning this month on Packard Bell and NEC Corp. <6701.T> personal computers, gives the user direct access to 54 applications, documents, and Internet sites, some of which users can customize.

Pixel has signed revenue-sharing deals with Walt Disney Co., Amazon.com, and others to provide content for some of the available slots on the interface bar. Tom O'Rourke, chief executive officer of Pixel, a spin-off from Packard Bell NEC Inc., says he came up with the idea of exploiting the unused space last year when he saw a televised sports event pushed up to make room for a score-board at the bottom of the screen.

"It's a pretty simple idea, and most good ideas are simple," he says. In the future Pixel could develop other technologies that take advantage of the space, such as an Internet browser that wraps around the Desktop or a control panel that lets users switch to another operating system, O'Rourke says. ■

It's A Boy

With a few thousand computer users watching via the Internet, a 40-year-old mother gave birth recently to a black-haired, blue-eyed boy, but clogged computer traffic limited the number of viewers.



Little Sean was born at 10:40 a.m. EDT on June 16, more than 4.5 hours after the broadcast began over America's Health Network's World Wide Web site. The cable network has 7.2 million television viewers as well as the Web site.

The woman, who identified herself only as Elizabeth, groaned several times before the seven-pound, eight-ounce baby was born. Viewers over the Internet saw nothing more graphic than an episode of "ER." Cameras were at Elizabeth's side and in front of her hospital bed, but nurses' backs blocked any view of the actual delivery.

"Here comes Sean's head. He has a lot of hair on his head," said Dr. Walter Larimore, who narrated the birth for the Internet audience from the delivery room. Also in the delivery room for the birth of the woman's fourth child were doctors, a camera operator, Gilbert (her husband), her two daughters, and her son.

"We just acted like nobody was there and everything went fine," says Gilbert, who after the birth sported a "Proud Father" T-shirt imprinted with baby Sean's footprints.

At least 50,000 people tried to log on to the network's Web site, which overwhelmed the system. America's Health Network originally thought 10,000 people would be able to watch the birth at the same time, but only 5,000 viewers gained access. ■



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3M Innovation

TECHNOLOGY NEWS

● Hardware

Franklin Covey has released a Palm III bundle featuring the latest version of the Palm Pilot packaged with ASCEND 97 PIM software. The Palm III delivers the added functionality of infrared beaming capabilities, increased memory, an improved user interface, and a sleek new design. The bundle will sell for \$399 (800/877-1814, 801/975-1776, <http://www.tech.franklincovey.com>). . . . If you have a Pilot in your palm, let it show you exactly where that palm is with Precision Navigation Inc.'s Palm Navigator. The \$39.95 Palm Navigator plugs into the bottom of the Palm Pilot and turns it into a map navigation system and an electronic compass. Also included is free MapSync software that allows for easy downloading and storing of multiple maps from the World Wide Web to your Pilot (888/422-6672, 650/962-8777, <http://www.precisionnav.com>). . . . Digitize your photos with AIMS Lab's new GrabIT II, a mouse-sized device that plugs into your PC's printer port. With a

camcorder or VCR hooked up to a power adapter that plugs into the keyboard port, it lets you capture 24-bit true-to-life color pictures at resolutions of up to 1,600 by 1,200 pixels with just one click. A passthrough port lets you print images without reattaching your printer directly to the PC. The bundled software lets you create multimedia postcards, fliers, and greeting cards. The device sells for \$69.95 with a \$20 rebate through October (510/661-2525, <http://www.aimslab.com>). . . . Matrox Graphics Inc. has the Productiva G100 graphics card available for \$88. With fast AGP acceleration for demanding business graphics and eight megabytes (MB) of synchronous, dynamic random-access memory (SDRAM), the G100 provides superior 2-D acceleration, improved 3-D and video performance, and a comprehensive multimedia upgrade path (800/361-1408, 514/969-6300, <http://www.matrox.com>). ■

● Software

Facing security problems? Use your face to solve them. Miro's Inc.'s new *TrueFace PC* and a computer video camera let you protect your PC with your physiognomy. *TrueFace PC* will automatically record anyone who unsuccessfully attempts to log on to your computer and uses a two-look view to detect fraudulent attempts to use a photograph. *TrueFace PC* is available for a \$59.99 download from Miro's World Wide Web site and runs on Windows 95 (781/235-0330, <http://www.miro.com>). . . . Catch all the info on your screen and lots that's not with The Software Lab's *ScreenPrint Gold 2.5*. This software, which retails for \$34.95, lets Windows users print anything they see on their screen with a single keystroke. In addition, other features

include SuperScroll, which automatically captures and prints entire Web pages that scroll off the screen; ImageSweep, that instantly captures every image, visible or not, from any Web page; and Graphic Enhancement Extras, 38 image enhancements, treatments, and special effects (425/869-6802, <http://www.software-labs.com>). . . . Panda Software International has released *Panda Antivirus* for Microsoft Outlook and Exchange. This antivirus software lets users confidently work with electronic correspondence without fear of contracting viruses. This solution, which sells for \$59, detects and disinfects in real time all viruses associated with E-mail attachments (800/603-4922, 415/392-5850, <http://www.pandasoftware.com>). ■



ScreenPrint Gold



Palm III
Franklin Planner

Business

Stay in touch with Omtool Ltd.'s *U-Page Messenger* for Microsoft Outlook and Exchange. This paging solution lets users send or forward Outlook and Exchange E-mail messages and alphanumeric messages to a pager from the desktop. In addition to general business applications, *U-Page Messenger* is designed for industries such as health care, law enforcement, and service and repair that rely heavily on paging systems. The solution is available for \$1,995 for unlimited users and \$995 for Exchange gateway (800/886-7845, 603/898-8900, <http://www.omtool.com>). . . . Quarterdeck's newest product, *DiskClone Extra Strength*, provides extra support for individuals moving from Windows 3.x or 95 to Windows 98 or NT. *DiskClone*, which sells for \$69.99, copies every file, folder, partition, and program from one PC to another. Users simply copy current programs, applications, settings, and configurations from their old hard drive to a new hard drive. The old settings and information are saved, providing a secure backup in case of problems with the new system (800/354-3222, 573/443-3282, <http://www.quarterdeck.com>). . . . Micro Logic Corp. has begun shipping *DiskMapper for Windows NT*, a graphical hard drive space management utility. *DiskMapper* sells for \$99.95 and gives users comprehensive file information in an intuitive map format that instantly shows disk usage graphically. The software lets NT users, system managers, and network administrators efficiently monitor, manage, and clean up hard drives (201/342-6518, <http://www.miclog.com>). ■

Maximum Convenience

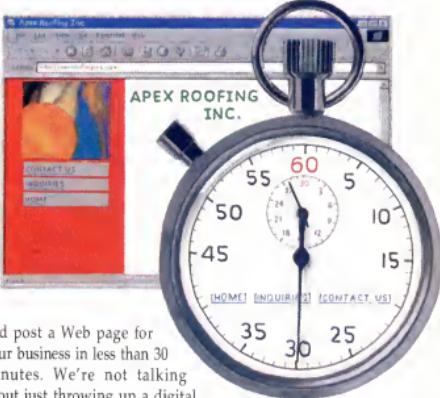
Meet your next employee of the month. Any small office/home office (SOHO) will appreciate the power of *Maximizer 5.0*—a contact manager and so much more. The handy package includes an address book, customizable calendar, World Wide Web site creation wizard, word processor, and more. It's a great addition to nearly any SOHO, especially if you're looking for a low-cost Web site solution.

Maximizer's E-mail function is actually a shortcut to your current E-mail program, with minor facelifts from *Maximizer*. The hot list keeps important meetings and tasks at your fingertips. The calendar offers several views, so you can

change the look to fit your needs. The address book keeps contacts handy and lets you store a ton of information, beyond the normal phone numbers and addresses.

Icons for the applications rest along the left side of the interface. We used the icons to easily flip among the address book, calendar, and E-mail editor. All the applications are flexible in how much and what kinds of information you can display. This becomes even easier through the drop-down list box at the top of each application that lets you choose which view you want.

The program's most impressive feature is the Web page creation wizard. You literally can create



and post a Web page for your business in less than 30 minutes. We're not talking about just throwing up a digital business card. You can include a catalog of products, complete with pictures (if you have them on file). You also can accept and process credit card transactions online. Just choose these options while you're going through the Web page creation wizard. As an added bonus, you can display your new Web page on the *Maximizer BusinessNet* for free.

Maximizer works with Windows 95, Windows 98, and Windows NT 4.0.

Maximizer 5.0

\$149
Multiactive Software Inc.
(604) 601-8000
<http://www.maximizer.com>

Ergonomic



—And Then Some

Memorex, known primarily for storage media, offers several computer accessories. The MX 3000 keyboard shows that Memorex is as serious about making high-quality input devices as it is about making audio tapes.

At its most basic, the MX 3000 is yet another ergonomic keyboard that's a pleasure to use. It reminds

us of Microsoft's Natural Keyboard Elite. Memorex, however, throws a few extra features into its keyboard with programmable buttons, located on the numeric keypad, that activate several features with one touch.

We could hop on the World Wide Web, pull up the Windows 95 calculator, open our favorite program, and flip through windows just by pressing the appropriate button. Several multimedia buttons control volume and can operate an audio CD in the CD-ROM drive.

A key in the extreme upper-right of the keyboard lets users toggle between these special function

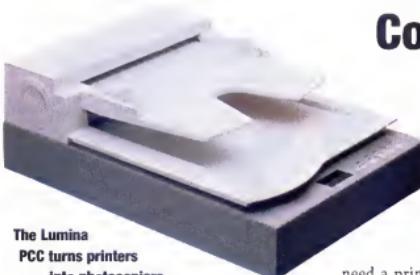
keys and the traditional numeric keys. You easily can pull up the calculator, press the button, and then use the numeric keypad as you normally would.

The keyboard earned a spot on our desks. This comfortable unit makes working in Windows 95 faster and more convenient. We recommend it to anyone. To take advantage of all the features, you need Windows 95, although it works as a regular keyboard under other operating systems.

MX 3000

\$44.99
Memorex
(800) 636-8352, (562) 906-2800
<http://www.memorex.com>

NOTES



**The Lumina
PCC turns printers
into photocopiers.**

You'd almost expect to see it on a late-night TV infomercial, alongside the infamous Ginsu knife. It slices! It dices! And look at those lovely julienne fries!

Well, you don't slice and dice with the Lumina PCC (Personal Color Copier), but you can scan and copy. For only \$249, this versatile device is a great addition to any home office. You will, however,

need a printer to use the copying function, which sends the image to be copied to your printer.

You don't even have to hook the Lumina up to your computer to use the copying function. Simply attach the parallel port cable from your printer directly to the Lumina and press the Copy button. The only stumbling block here is that you have to adjust some switches on the back panel

of the Lumina to make sure it works with your printer. And there aren't many printers listed in the instruction book, which means that you may be unable to tell how you need to set the switches so it will work with your printer.

Still, we like the notion of having all the convenience of a copier for so little cash. And the flatbed scanner is cool, also. We scanned several documents into our computer, using color and black and white images, as well as text documents. The color and black and white images came out quite well. The text documents weren't so smooth. We tried to convert the image of the text document into

an actual, editable text document using the optical character recognition (OCR) software included in the package. It took a couple of attempts to convert the image to text and actually edit it.

The software includes a fax utility, so the Lumina can work as a fax machine if you have a fax/modem. The software also includes iPhoto Express from Ulead Systems. With iPhoto Express, you can edit all the images you scan in your computer for business and personal use.

At its price, this product is a bargain that combines several important office components in one neat package that performs well.

Lumina PCC
\$249
Lumina Office Products
(408) 487-0400
<http://www.luminapcc.com> ■

Somebody Is Watching You

If you suspect an employee at the office, or a child at home, is using your PC inappropriately, you can gather the evidence to prove it using Charles River Media's *Internet WatchDog*. The program, which comes in several packages (\$40 for the Personal Edition, \$100 for one to 10 PCs, and \$500 for one to 100 PCs), operates in the background taking screen captures, logging application use, and noting image file downloads. If somebody uses your computer to access an unseemly World Wide Web site, spends hours playing Solitaire, or downloads a dirty photo, *Internet WatchDog* will know and so will you.

As the administrator, you access the program through a password you choose. You decide when to turn the program on or off, when it takes screen captures, and when it scans for new image files. Only you can view the information *Internet WatchDog* records.

Unlike some "security" programs, the nice thing about *Internet WatchDog* is that it doesn't attempt to filter Web content, which is a dicey proposition at best. Instead it lets you know what finds its way to your Desktop. If you're trying to prevent your kids from seeing certain things, look elsewhere. But if you'd rather keep an eye on them, and deal with errors in judgment later, this could be the product for you.

Installing *Internet WatchDog* (Personal Edition) takes only minutes, and its straightforward interface makes operation easy. It runs on Windows 95 and Windows NT.

The screen capture feature of Internet WatchDog lets you keep tabs on what people are viewing on your PC.

Internet WatchDog
\$40 to \$500
Charles River Media Inc.
(800) 382-8505
(781) 871-4184
<http://www.charlesriver.com> ■



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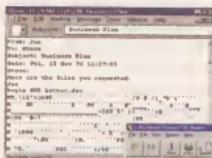
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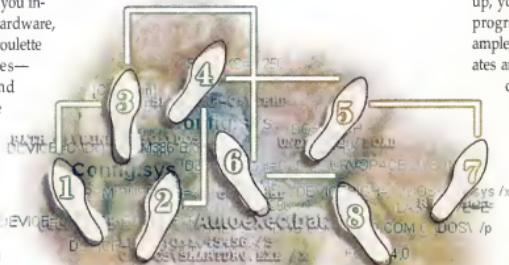
Virtualy every time you install software or hardware, you play Russian roulette with your startup files—namely Config.sys and Autoexec.bat. Will the new hardware device driver you just added to the Autoexec.bat file throw a wrench into your startup sequence? Will the new memory management software you installed cripple your computer when Config.sys calls on it? While these are admittedly worst-case scenarios, it's always worth knowing how to pinpoint problems in your Config.sys or Autoexec.bat file.

First, you should always create backup copies of system files before installing new drivers or system utilities, such as memory management software, and have an emergency startup diskette on hand. That way you can simply start (boot) the computer from the emergency diskette and replace the files with their backup copies.

There is a faster and more informative way, however, to go about fixing the problem. Simply replacing the files with their backups doesn't tell you anything about what went wrong, such as which element of the startup file didn't work or why it malfunctioned. The only place you will see an error message is in the computer's bootup process. The bootup process can quickly scroll by on-screen, so quickly that it's hard to find and interpret what your computer is telling you. Something in that flurry of text could provide a valuable clue as to what is not working.

One Step At A Time. DOS provides a way to slow things down a bit. If you press the F8 key immediately after you see "Starting MS-DOS" on-screen, you can go step-by-step through the Config.sys and Autoexec.bat files.

A second or so after press F8, then you'll see "MS-DOS will prompt you to confirm each



CONFIG.SYS command." Config.sys will now run one line at a time. Each command is followed by a [Y/N] for yes or no. Type Y to run the command. Type N to skip the command and move to the next one. Autoexec.bat is up after you finish checking through Config.sys.

Software. The first time you try a step-by-step bootup, run the software suspected of causing the problem to see if it generates an error message. If you installed memory management software—handy for accessing the computer's extended memory—and either your software or hardware is not working, watch for commands that resemble the name of the installed software. Chances are a resulting error message won't be of much help to you, but if you call the software company's technical support department, the error message could go a long way in helping them diagnose the problem.

(NOTE: If you skip a command by typing N, you may be unable to completely boot the computer. After you complete the confirmation process of the file's other lines, you will have to reboot your computer.)

Hardware. The same procedure applies for problems with any hardware drivers in the Autoexec.bat file, which runs after Config.sys. Like in Config.sys, the computer will ask you whether you want to run the file. If you answer yes, it will run it line by line, pausing to ask your permission before executing each

command. If you run across an error you don't know how to solve, write it down and contact the hardware company for technical support.

Cancel Trouble. In the meantime, however, you can use the step-by-step bootup to exclude the troublemaker from your startup sequence. Then, once your computer has booted up, you can edit the file that ran the problem program and remove the command. For example, if you install a hardware driver that creates an error message every time you boot the computer, you can edit Autoexec.bat and remove the driver.

Your best bet may still be to replace the Autoexec.bat file with its backup copy, but at least with the step-by-step bootup procedure, you can obtain a better look at the error message.

More Reasons. Troubleshooting isn't the only time a step-by-step bootup is handy. It's an easy way to put the brakes on before running Windows 3.1. The Autoexec.bat file often contains the command to run Windows at the end. By stepping through Autoexec.bat and answering no to this line, you can reach the DOS prompt, without waiting for Windows to load.

Step-by-step bootup also makes it easy to selectively load hardware drivers. Not loading hardware drivers saves memory, so if you won't be needing a certain peripheral and need a memory boost, this is a good way to keep those drivers out of memory without removing them from the startup files.

Step-by-step batch files. The startup process isn't the only time running batch files step-by-step is handy—it's possible. To run a batch file step-by-step (the computer pauses to ask your permission to run each line of the batch file), at the C> prompt type:

`command /y /c name of batch file`

For example, `command /y /c test.bat` would run the batch file Test.bat one line at a time. This comes in handy for the same reason it does on bootup: troubleshooting. If you can't figure out why a batch file isn't working correctly, slowing it down and watching it run could give you some clues as to what is going wrong. ■

by John Lalonde

Windows 3.1

Performance Optimization

Windows 95 is 3 years old, Windows NT is even older, and now we have Windows 98 as well. You would think these powerful, full-featured operating systems would have overtaken the 1993-vintage Windows 3.1 by now. You would think wrong.

Millions of PCs, especially in the business world, still use Windows 3.1, along with its enhanced cousins, Windows 3.11, and Windows for Workgroups 3.11. These operating systems aren't as robust as or powerful as their progeny, but those who believe that "if it ain't broke, don't fix it," have stuck with what they know.

If someone's going to stick with Windows 3.1, it might as well perform as well as possible. Below, we provide a few tips you can employ to improve the performance of a Windows 3.1 system and avoid problems such as crashes. Most Windows 3.1 systems are running on older hardware, typically 486-class machines. Therefore they are more sensitive to inefficiencies in operating system setup than modern PCs with "power to burn."

(NOTE: We refer here to all the variants of Windows 3.1 and 3.11; the optimizations are basically the same.)

The Importance Of System Resources.

The number one issue in ensuring that a Windows 3.1 system runs smoothly and efficiently is managing system resources. This term refers to several small areas of your PC's memory that Windows uses for internal purposes. These pockets of memory are limited in size and must be shared by the operating system and all the applications in use on the PC. Adding more memory doesn't change the size of these resources, so optimizing and conserving them is crucial to ensuring that Windows works well.

Unfortunately, when Windows begins to run out of system resources, you don't usually receive a clear and simple error message. Often you receive a message that says "Out of memory," but this is misleading; you are actually running out of room in these shared

memory spaces, not overall system memory. At other times, however, you won't see an error message; you'll just find that the system begins to exhibit erratic behavior such as crashing programs, corrupted files, incompletely displayed windows, and video image problems.

It's simple to check the status of your system resources. Select the Program Manager's Help menu, then choose About Program Manager. A dialog box will pop up showing you the amount of free memory and the percentage of available system resources. If the amount of system resources available is less than 40%, your machine may slow down or you may experience system problems. Letting system resources drop to less than 20% is likely to lead to erratic behavior. Follow one of the many suggestions below to maximize or restore system resources, so your computer will run efficiently and mostly error-free.

Use Only What You Need. Every program you open in Windows takes up memory and system resources, some more than others. It is convenient to have multiple programs open simultaneously, so you can do more than one thing at a time. To conserve memory and resources, however, you should close applications you are not actively using (open programs have either full windows on the screen or icons at the bottom of the screen).

A common cause of system resource overuse is opening the same application more than once by accident, so avoiding this is also helpful. Make sure you examine the open programs before you launch any new ones.

Regularly Reboot Windows.

One major problem with Windows 3.1 is it "loses" system resources. Sometimes when you open a program, use it for a while, and then exit, you are left with fewer system resources than before you opened the program. Any time a program crashes, you also lose some system



You can check the status of your system resources using the Help menu's About Program Manager command in the Program Manager.

resources to the operating system. Over time resources will slowly "leak" away, and if you leave the PC running for several days you may eventually find that you only have around 50% of the system resources available, even when no applications are open.

The simple way to avoid this problem is to restart (or reboot) Windows on a regular basis. We recommend you do this at least once a day to keep the system running smoothly. You don't have to reboot the PC itself; just exit and re-enter Windows. Select Exit Windows from the Program Manager's File menu. Next, click the OK button in the Exit Windows dialog box. Then type `win` at `C>` prompt and press the `ENTER` key to restart Windows.

Reduce The Overhead. Over time you will probably collect a great deal of utility programs that automatically load when you start Windows. Many applications set themselves up to automatically load components when you start up Windows. For example, *Microsoft Office* comes with a toolbar utility that loads as soon as Windows starts.

If you don't actually use these tools, you should bear in mind that each of them takes up memory and system resources and clutters the

system without providing any real benefit. If you aren't using them you should change your setup so they don't automatically load. If you look in the Program Manager, you will find a group called StartUp. Every icon in this group represents a program that automatically loads with Windows. Deleting an icon here (or moving it to another program group, which is less permanent) will stop the item from loading sans your consent. (NOTE: Don't rename or delete the StartUp program group itself.)

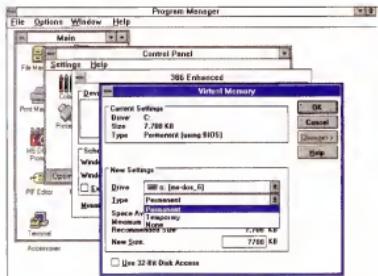
Some programs automatically load or run through the Windows system files Win.ini and System.ini. Be extremely careful before changing these files.

Decrease Display Color Depth.

Some video cards come with special utilities that let you set them to display more than the standard 256 colors (also called 8-bit color) commonly used within Windows. The use of high color (16 bits per pixel) or true color (24 bits) makes color representation much more realistic and is indispensable for some, such as those doing graphics work. They also just make Windows look and feel more comfortable. The extra color information, however, takes memory and system resources. Therefore, if you have system resource difficulties, you can improve the situation by scaling back to the 256-color mode.

A problem that sometimes plagues Windows 3.1 users is that of the icons in a Program Manager group turning black. This is also a system resource problem, caused by too many icons being in a group when the system is running at high-color depth. Dropping down to 256-color mode will eliminate the problem, as will splitting large Program Manager groups into multiple groups of smaller size.

Watch Your Disk Space. Windows isn't smart about detecting and dealing with a full hard drive. You should always watch how much disk space you have free; if your hard drive (especially the C: partition where Windows normally lives) becomes too full, performance will degrade and strange behavior may result. If free space falls to less than 10 megabytes (MB), it's probably time to clean up old files you no longer need. (Everyone has some!)



You can check the status of your system resources in Windows 3.1 using the Help menu's About Program Manager command in the Program Manager.

Scan For File System Problems.

The file system describes the directories, files, and control structures that organize the data on your hard drive. Occasionally, problems can develop with these structures. This is why you should scan your system once a week. This will detect problems early, so they can be corrected before serious corruption or data loss occurs.

Scanning for file system problems is easy. Select Exit Windows from the File menu in Program Manager to go to DOS, then run ScanDisk from the DOS prompt (assuming you have DOS 6.0 or later) by typing scandisk at the C> prompt. ScanDisk will do the rest, prompting you for permission to fix any problems it encounters.

Create A Permanent Swap File.

Windows makes use of virtual memory to let it run multiple programs and handle large amounts of data. Virtual memory is a software scheme where Windows makes use of hard drive space to simulate memory. This powerful technique is what enables multitasking (running of multiple processes) in modern operating systems, using relatively small amounts of physical memory.

A special file on the hard drive is used to hold virtual memory information. By default, Windows 3.1 uses a temporary swap file. In this arrangement Windows creates the swap file each time you start Windows and then removes it when you shut down. The alternative is a permanent swap file, which always stays on your hard drive. You have less room for your applications when you do this, but you gain a permanent performance boost.

To set up a permanent swap file, follow these steps:

- Select Exit Windows from the File menu in the Program Manager.
- Click the OK button in the Exit Windows dialog box.
- Run the Defrag tool from DOS by typing defrag at the C> prompt.
- Select your hard drive and press ENTER.
- Select Optimization in the Recommendation dialog box. This will defragment your hard drive, collecting the files into one place, making it easier for Windows to find sufficient space for the permanent swap file. (It's a good idea to do this every month or so.)
- Select the Exit DEFrag command, using the TAB key, to finish.
- Restart the PC by pressing CTRL-ALT-DELETE.
- In Windows, open the Control Panel (found in the Main program group.)
- Double-click the 386 Enhanced icon.
- Click the Virtual Memory button in the dialog box that appears.
- Click the Change button in the Virtual Memory dialog box.
- Change the Type drop-down menu to Permanent. Use the size Windows recommends for the swap file.
- Click OK and close the dialog boxes to complete the procedure.
- Exit Windows and reboot the PC by pressing CTRL-ALT-DELETE. (After rebooting, your system will be using the permanent swap file.)

Disk Caching. If you have enough physical memory, the use of a disk cache can greatly improve performance. The disk cache is kind of the opposite of virtual memory. In this case, the operating system uses part of memory to hold the contents of recently accessed files from the hard drive. Since memory is much faster than disk, this improves performance substantially.

For Windows 3.1, disk caching is done using the SmartDrive program by typing smartdrv at the DOS prompt. If you include a line in your Autoexec.bat file, SmartDrive will automatically load when you boot your PC; to load it with its standard defaults, type

c:\windows\smartdrv.exe

on a line by itself in Autoexec.bat. SmartDrive has many features, which you can see by typing smartdrv /? from the DOS prompt. ■

by Charles M. Kozierok

Windows 95

Creating Multiple Users

When many people are using the same computer, things can get a bit hairy. Inevitably, someone will leave a bunch of files on the Desktop, change the Desktop pattern, or make some other change that will drive someone else crazy. Windows 95's tools for personalizing Windows help one machine peacefully host multiple users, each enjoying their own settings. It's as simple as setting up unique passwords.

Double-click the My Computer icon on your Desktop and open the Control Panel. Next, double-click the Passwords icon. In the Passwords Properties dialog box, click the User Profiles tab. Click the Users Can Customize Their Preferences And Desktop Settings button and make sure there is a check mark in both boxes in the User Profile Settings area. Click the OK button and restart (reboot) the PC.

The next time Windows launches, it will ask you to log in. The user name you typed in when you installed Windows will automatically appear in the User Name field, while the Password field will remain blank. Just click OK; you shouldn't have to enter a password. While this is the first login you created, it's not the "master" account; changes made by this user will not change the default Desktop. We'll explain how to change that later.

New User Profiles. To create additional logins, you must first logoff by going to the Start menu and selecting Shut Down. In the Shut Down Windows dialog box, select the Close All Programs And Log On As A Different User option and then click Yes. Then, when prompted to log in, type in a new user name. If you'd like, type in a password, but it's not necessary. Click OK and confirm your password. If you didn't type one in, leave the fields blank and click OK. Next, Windows will ask if you'd like to retain individual settings. Click Yes to make sure any changes you make to the Desktop, the Start menu, or other settings—are saved.

When the Windows Desktop comes up, if you have folders on the Desktop, make sure

their contents are still there. The contents of the folders were not copied if the folders are empty. Open the directory C:\WINDOWS\DESKTOP, then open the folders with files missing and copy them into the folders on the Desktop.

Customizing. Each user can add or remove items from the Desktop and change the Desktop pattern. If a user adds items to the Desktop, or removes them, the changes are only reflected in that account. You can customize the Start menu by right-clicking the Start button and selecting Explore. This opens Windows Explorer, which lets you delete or add items from the START MENU folder (located under the WINDOWS folder).

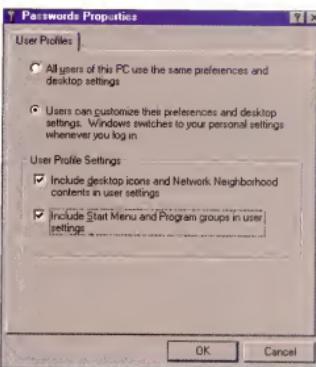
With the *Internet Explorer 4.0* World Wide Web browser, you also get a Users control panel that lets you further customize each user's settings. It lets users have separate Favorites (lists of favorite World Wide Web sites) in Internet Explorer.

Master Control. Each time a new user creates an account, they start off with the default Desktop. To change this default Desktop, create a new user name. When Windows asks if you'd like to retain individual settings, click No. Any changes you make to the Desktop—from deleting folders or files to changing the Desktop pattern or Start menu—will be included in any new accounts created afterward.

Likewise, any files a user deletes from the hard drive will be deleted from all accounts, not just one—even if someone clicked Yes when asked if they want to retain individual

settings. That happens because the accounts all share the same hard drive. Only the Start menu and items on the Desktop are separate. If one user deletes a program or file, no one will be able to use it.

Security. The Passwords feature lets multiple users customize the computer; it does not password-protect sensitive files. Because you can create as many additional users as you



The Passwords
option in the
Control Panel
lets you create
multiple user
names, each
with customized
Desktops and
Start menus.

want—and it doesn't require a password to create a new user name—there's no way to use the Passwords option in the Control Panel to lock people out of your computer. Even though you can hide items by removing them from the Desktop and Start menu, anyone who can log in can click the My Computer icon and access everything on the hard drive.

To go back to the good old days when several people were all using (and abusing) the same Desktop, open Passwords in the Control Panel and click the User Profiles tab. Click the All Users Of This PC Use The Same Preferences And Desktop Settings button, click OK, and reboot. ■

by John Lalonde

Windows 95 Play Detective In Safe Mode

When your computer is dealing you fits with repeated stalls, crashes, or poor performance, and you're not a faint-hearted or inexperienced computer user, you may want to seek out and destroy the corruption. First, you'll need to isolate the files and hardware that typically cause these problems. Windows 95 gives you that control in a booting procedure called Safe Mode. Safe Mode starts a clean system, which isolates hardware, so you can begin detecting and troubleshooting.

Safe Mode is a good option if:

- You've recently installed hardware, and your system stalls
- Your operating system or computer repeatedly stalls or slows down dramatically for no apparent reason
- Your display isn't working properly
- Your operating system doesn't start after you see the "Starting Windows 95" message
- You can't print to your local printer after doing all the printer troubleshooting
- You intermittently receive error messages.

Start Up. Three ways are available to get into Safe Mode. First, you need to shut down your system and reboot. This will give your operating system time to save and close all open files. When you see the "Starting Windows 95" on-screen message during the rebooting process, push the F5 key to go directly into Safe Mode or press F8 to access the options in the Windows 95 (Win95) Startup Menu, one of which is the Safe Mode option. If your computer boots too fast to see the "Starting Windows 95" message, press the F8 key once you hear the beep signifying the end of the Power On Self-Test (POST).

You also may end up in Safe Mode if you didn't exit normally from your operating system. For instance, if an application stalled and you pressed CTRL-ALT-DELETE twice, Win95 will automatically boot up in Safe Mode. Whether you're in Safe Mode by choice or by default, you'll find yourself in a stripped-down version of Win95, minus most hardware and peripherals.

If you press F5, you'll immediately know you're in Safe Mode because it's written in the four corners of your screen. If you press F8, the first thing you'll see is the eight options in the Microsoft Win95 Startup Menu: Normal, Logged, Safe Mode, Safe Mode with Network Support, Step-by-step Confirmation, Command Prompt Only, Safe Mode Command Prompt Only, and Previous version of MS-DOS.

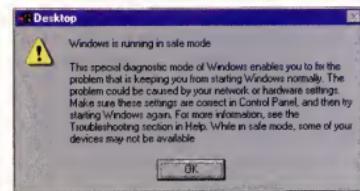
For the purposes of Safe Mode, you only need to work with options 3, 4, and 7. Option 3 is the same as pressing F5; you'll go into a stripped-down Win95, and your screen may look strange because it's in a 16-color, low-resolution setting. You also can reach Option 4 by pressing F6 when you start up your computer. It also will bypass your startup files and let you use only your basic system drivers; this includes your network driver. Unless you really know what you're doing, you won't want to choose Option 7; it loads the Command.com and DoubleSpace or DriveSpace file, but not Himem.sys, Ihelp.sys, or Win95. Command Prompt Only is for users who know how to navigate computers with command-line switches and tools. You will enter the commands you want your computer to execute if you choose this option.

The Process. When you boot up in Safe Mode or Safe Mode With Network Support, the only device drivers that load are those for your mouse, keyboard, and standard video graphics array (VGA). With these three drivers, the minimum Win95 will run, putting you in a position to better diagnose the problem.

Safe Mode operates by bypassing the startup files Config.sys and Autoexec.bat, the Win95 Registry, and the [Boot] and [386enh] sections of System.ini. Config.sys is the text file that configures your system's hardware, such as your sound card, graphics card, and CD-ROM drive. Autoexec.bat lists repetitive DOS

commands that are performed each time your computer boots. The Win95 Registry keeps track of all the hardware hooked up to your computer. If you upgraded from an earlier version of Windows, you will have the System.ini file even though your system doesn't need the file. This file also houses information concerning the location of hardware and some software.

You need to bypass or isolate these files so that when one or more of your files or pieces of hardware are corrupted or improperly configured, they won't cause problems such as



You'll see this warning message when you start up your system in Safe Mode; and to remove all doubt, note "SAFE MODE" is written in the four corners of your screen.

system crashes or the inability to access your other files and hardware. This system bypass gives you more control over your computer by eliminating any drivers that may have been improperly loaded, have become corrupted, or were given faulty commands when you edited the batch or system files. When in Safe Mode, you can access these files and edit them through Notepad or WordPad.

Clean It Up. Now, it's time to take out your backup copy of your system files. Yes, you should have made a backup copy of your files long before your problems started.

Use the clean copy to replace the system file section where the suspicious file or driver resides and reboot to see if your system runs properly. If it does, you've solved the problem. If not, pick another untrustworthy device driver and replace its system file entry.

Safe Mode is not for the beginner. Navigating in Safe Mode requires experience manipulating system files. But if you know your way around your system, Safe Mode provides the ability to go in and solve the mystery. ■

by Katie Powers



Anyone can recognize speech. But can they do it accurately?

Introducing ViaVoice 98.

There's a lot of speech recognition software out there. So what makes new ViaVoice™ 98 so accurate?* It's the only one that uses three-word algorithms, instead of two. For example, if you dictate a sentence starting with "That's fine, except you won't...", ViaVoice 98 knows to spell "except" and not "accept." How? It recognizes the two words



before and after "except" and instinctively picks the most likely spelling based on the context. New ViaVoice 98 with triple-word algorithms. Starting at just \$49; it's not only accurate, it's right on the money. Look for ViaVoice 98 at your favorite software retailer. And for more information, visit www.ibm.com/viavoice or call 1 800 IBM-2255.



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Basic Training

Regardless of the operating system you choose, there are a few elementary functions you should understand. This section is your one-stop guide to learning these crucial first steps in DOS, Windows 3.1, and Windows 95. Use it to learn your operating system and see whether others offer a smarter way to work.

HOW & WHEN TO PRINT HELP TOPICS



Most operating systems have hundreds of on-screen instructions for how to handle little and not so little emergencies that crop up. These instructions are housed in Help files and are fairly easy to access and understand. Used in conjunction with your manual, they provide an excellent source of instructional guides and even troubleshooting information if your system starts behaving erratically, locks up, or crashes. If and when the unfortunate crash occurs, however, the volumes of information in the Help files will be inaccessible and do you absolutely no good if they're neatly tucked away on your hard drive. To be on the safe side, you may want to plan for an emergency by taking a few minutes to print out some of the Help topics we've recommended below. Although you could conceivably print all the Help topics, some are far more relevant to the problems that can cause operating system errors and crashes, making them prime candidates for hard copy backups. Turning Off Sound Effects or Changing Printer Passwords are useful topics to know, but you probably won't worry about these procedures unless your PC is functioning properly, which means you can read them on-screen.

■ MS-DOS 6.22. DOS' Help files are easy to access, thorough, and simple to print out. We'll offer a few suggestions, but keep in mind that you're the user, and if there are additional files you would like to have, don't limit yourself to the ones listed here.

The Config.sys file is where you configure your system's hardware. This is a common place for errors that cause your system to lock up or crash. Besides backing Config.sys itself before reconfiguring, it's wise to print the Help file covering Config.sys and have it on hand in the event of a system malfunction. You also may want to include the following: Ansi.sys, Batch Commands, Buffers, Command, Debug,

Device, Device Drivers, Display.sys, Interlnk.exe, Restore, and Sys.

- Let's use the Config.sys commands help file as an example:
- At the C> prompt, type help and press ENTER. (This command is not case-sensitive, so you can type it in lowercase, uppercase, or mixed.)
- This will land you at the MS-DOS Help: Command Reference help directory. You'll see the navigation bar at the top with the File and Search menus, which you control with keystrokes. Anytime you're ready to exit Help, press ALT-F, X. The Command Reference screen lists three columns of Help topics in alphabetical order. Use the arrow keys or the PAGE DOWN key to see more commands. If you're not sure how to use Help or what exactly you are looking for, MS-DOS provides a tutorial called How To Use MS-DOS HELP. Press ALT-H, H to open the file. Then, use your arrow keys to scroll to a topic and press ENTER to select one. You also can use the function keys to access the tutorial—simply press F1. To exit How To Use MS-DOS Help, press the ESC key.
- To go to the Config.sys Commands Help file, using your arrow keys to move the cursor down to the file, then select the file by pressing ENTER.
- The Help file for Config.sys Commands opens and provides a brief explanation of the contents and what's housed there. It's mainly information on configuring your computer's hardware components. There is also a list of some of the MS-DOS files and applications, which all have further instructions for use and troubleshooting. Scroll down or use your arrow keys to move the cursor to the topic you wish to print and then press the ENTER key. Next, press ALT-F, P.
- You then will see the Print Box. You'll be given the option of printing the current topic to a printer or to a file. Again, we recommend printing out the topics so you have a hard copy in the event of an emergency. If you are ready to print, simply press ENTER, and the topics will print.
- Repeat the above procedures until you have printed all the Help files you want. To Exit the MS-DOS Help directory, press ALT-F, X.

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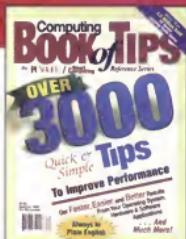
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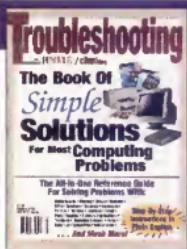
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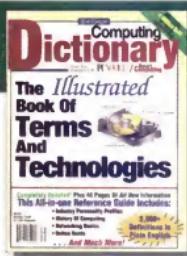
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There's a note to users on the MS-DOS Help Reference screen that says if you want an official hard copy of all the Help topics, you can use the coupon in the back of your User's Manual for instructions about ordering. This is a reminder that the topics contained in the online Help files are not included in the User's Manual. Planning ahead and printing out some of the more relevant topics might save you hours of frustration in the long run.

■ Windows 3.1. Unlike MS-DOS and Windows 95 (Win95), Windows 3.1 does not have a central directory of Help topics. In each window you open, whether it's Program Manager, File Manager, Paintbrush, or any other application or accessory, the help topics are specific to that particular window, application, file, or accessory. In Main, for instance, you can either access the Help topics germane to Main, or you can click the icons for things such as Control Panel, Windows Setup, Terminal, and PIF Editor, and access the Help topics pertinent to those settings. A number of Help topics from Control Panel and Windows Setup would be beneficial in an emergency. You'll probably want to print the Help instructions for the following: Allocate System Resources, Change Serial Port Settings, Change Swap-File Settings, Install & Configure Printers, Install And Remove Device Drivers, and Change Settings On Communication Ports.

Let's say you want to print the Change Serial Port Settings file from the Help menu. Here's how:

- In Program Manager, double-click the Main icon.
- Once Main is open, find and double-click Control Panel.
- At the top of the window on the navigation bar you'll see the Settings and Help menus. Click the Help menu and then the Contents command.
- The Control Panel Help window opens, and you'll see a brief tutorial about Help, with lists of Help topics. Scroll down to Change Serial Port Settings and select it by clicking once.
- To print the file, go to the navigation bar and pull down the File menu. Next, select Print Topic.
- Your Print window should appear, and you simply click OK to print the topics.

You also may want to print Help topics from the Windows Setup icon, also located in Main, including: Add/Remove Windows Components, Change System Settings, and Set Up Applications.

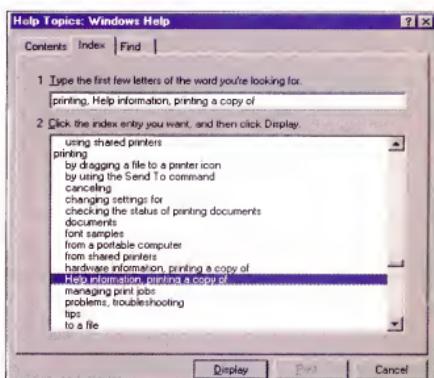
■ Windows 95. In Win95, we suggest you print anything related to backing up files, startup files, and restoring deleted files. We would also print anything related to interrupt request lines (IRQs), which are the communications routes in your computer that carry interrupt signals telling the central processing unit how to handle service requests from PC components. Each computer component has its own IRQ, and they are prioritized according to the importance of each device. Frequently, adding new devices causes IRQ conflicts when the new device tries to usurp the line designated for another device, which will cause a variety of errors and

problems for your system. You also may want to print out a few topics related to Device Drivers: Device Configurations, Adding/Changing Device Drivers, Enabling And Disabling Hardware Devices, Enabling And Disabling Devices, Setting Up Devices, and Troubleshooting Devices. Many users keep a number of Troubleshooting Help files handy: Connection Problems, Disk Space, Hardware Conflicts, Memory, PC Card Problems, Running Problems, and Windows Startup Problems.

Win95 has a central directory of Help topics you can access through the Start menu if you wish. Go to the Start menu and click Help. A Help Topics: Windows Help window will then open. It has three tabs instead of the standard navigation bar: Contents, Index, and Find. You also can access the Help topics for things such as individual programs, settings, and accessories by going to any of those icons, clicking to open, and then pulling down the Help menu.

Deciding which files to print is the hard part; printing them is easy. Let's print the help topic, To Start A Program By Using The Run Command from Start.

- Go to Start and click Help.
- When Help Topics opens, click the Index tab.
- Either type **run** or **running** in the first box (you'll be prompted, Type The First Few Letters Of The Word You're Looking For) or scroll down to the R's and find Running Programs by using the Run Command.
- Select Run Command, Using and then click the Display button.
- The topic box opens with the information. You can enlarge the box by clicking the box in the upper-right corner (lodged between the minimize button—a minus sign [-], and the close button—an "X").
- To print the help topic, click the Options button and then click the Print Topic command from the drop-down list.



In Windows 95's Help files, you will find an abundance of information that could help you during a system crash.

You should now find yourself in your familiar Print box with all the normal options.

RUNNING EXECUTABLE FILES



With all the free and shareware applications available on the Internet, it's only a matter of time before you find yourself trying to use an executable (.EXE) file. An .EXE file is a program your operating system can open and run, as opposed to data files, which are collections of data used by executable files. If you're hoping to run an .EXE file, be sure you select the version that's compatible with your operating system. For this article, we downloaded the DOS version of *Meal-Master 8.05* (<http://ourworld.compuserve.com/homepages/S.Welliver/MMDown.htm>) and loaded it on a system with DOS 6.22. For Windows 3.1 and Win95, we downloaded versions of the test application for *Retirement Planner '98* from Torrid Technologies Inc. (<http://www.torrid-tech.com>). The instructions below discuss self-extracting .EXE files (one that unzips, or decompresses, itself without help from another application). Some .EXE files are not compressed; you can access them with the instructions below, as well. The process just won't include the automatic decompression step.

MS-DOS 6.22. For a self-extracting file, loading and running an .EXE file is probably one of the easiest things to do in DOS.

- Put the diskette in the A: drive.
- At the C> prompt, type a: to change the drive.
- At the A> prompt, type the name of the file, such as mm805.exe. (If the file is on your hard drive, execute these instructions at the C> prompt.)
- The file opens and welcomes you to the Meal Master Recipe File Database. From here, you'll receive program-specific instructions that prompt you through creating a directory to house your new files. Meal Master lets you know that you can't save the archives and program on a diskette because there isn't enough space. It walks you through creating a directory on the drive of your choice. Once created, you're ready to run the program.
- To open and run, simply type the file name at the C> prompt.

Windows 3.1. Two ways to open and run an .EXE file are available: through File Manager and through the Run command in Program Manager. Both ways take you step-by-step with plenty of prompts, and neither is particularly difficult. Let's deal with the File Manager route first.

- Put your diskette in the A: drive.
- In the Program Manager, open Main and then File Manager.

- Click the A: drive icon, and the name of the file (401k3985.exe, in our example) appears on the right side. (If the file is on your hard drive, locate the file there and follow the instructions below.)

- Double-click the file name, and a dialog box will appear with the title, WinZip Self-Extractor across the top. You'll see the title and volume number on the left and three buttons, Setup, Cancel, and About, on the right. Click the Setup button if you wish to proceed with unzipping and loading the file. Because it's a self-extracting program, you won't need a separate program to unzip the file, nor will you have to do anything to begin the process except click Setup. Cancel will take you back to File Manager. About tells you more about Retirement Planner.

- After clicking the Setup button, the file will unzip itself. When it finishes, the Retirement Planner Setup dialog box appears. This box contains information about the licensing agreement. You can read the agreement by clicking the button marked, README.TXT, or you can click the button marked, Proceed With SETUP, and read the licensing agreement later.

- After clicking the Proceed button, another dialog box will appear with the instructions, Enter The Driver Or Path Containing The Retirement Planner Source Files. The path C:\TEMP\~Wzs0656.lmp should appear in the text box marked, Install From:. If you decide not to proceed from here, click the Exit Setup button, click OK when queried if that's really what you want to do, and then you'll exit setup. To finish the installation, just click the Continue button.

- A dialog box will appear asking if you want to install Retirement Planner in a different directory. Your system will default to the C: drive. A text box after the Install To: command contains the path C:\Plan98. If you want the program installed on your C: drive, click the Continue button; if not, enter the drive to which you want the program to install. If you want to exit, click Exit Setup.

- A final dialog box appears called Retirement Planner Setup with the message that the Retirement Planner Installation is Complete. Click OK, and a new box appears in your Program Manager with two icons: Retirement Planner and Read Me. Retirement Planner is the program, and Read Me is the legal stuff.

- Double-clicking the Retirement Planner icon will open the program, and you'll be on your way to planning your financial future.

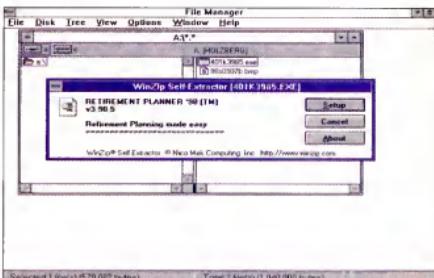
Another way to run an .EXE file in Windows 3.1 is through the Program Manager.

- After putting the diskette in the A: drive, pull down the File menu and click Run.
- You'll see a dialog box with a command line and a blinking cursor on the left. There will be four buttons on the right: OK, Cancel, Browse, and Help. If you know the path and name of the file, you can key it in the command line and click OK. If you decide to wait until later, click Cancel. If you're feeling a bit unsure about all this and want a quick online tutorial, click Help. Otherwise, click Browse.

- A dialog box appears with File Names at the top left and Directories at the top right in the Browse dialog box. At the bottom of the box, you'll see List Files Of Type on the left and Drives on the right. Click Drives and select the A: drive. The file name 401k3985.exe appears in the File Name box. On the far right side of the dialog box, there are three more buttons: OK, Cancel, and Help. Click 401k3985.exe to highlight it and then click the OK button to continue.
- You'll go back to the dialog box with the Command Line, and now the file name and location (A:/401k3985.EXE) are in the RUN box. Once again, click OK, and you'll see a dialog box that says, WinZip Self-Extractor, across the top. You'll see the title and volume number on the left and three buttons on the right: Setup, Cancel, and About. Click the Setup button if you wish to proceed with loading the file. Cancel will take you back to File Manager. About tells you which volume you're attempting to load and the copyright date.
- From here, the instructions are identical to those of the File Manager instructions listed above. Simply begin at step five, and you'll have your financial planning program loaded and running in no time.

■ Windows 95. There are also two ways to load and open an .EXE file in Win95. We'll look at Run through Start, first.

- Put the diskette in the A: drive.
- Click the Start button and then click Run.
- A dialog box will appear with the following instructions: Type The Name Of A Program, Folder, Or Document, And Windows Will Open It For You.
- Click the down arrow on the right side of the command box. You'll want to scroll down and select A: to select the A: drive. (If the .EXE file is on your hard drive, select it from that location.) Under the command box, you'll see three buttons: OK, Cancel, and Browse. If you click OK, you'll see the dialog box for your diskette and the list of all the files on your diskette. Select the 401k3985.exe file, and double-click.
- If you click Browse instead of OK, you'll see the Browse dialog box with the 401k3985.exe file. To select the file, highlight it and click the Open button. Then, click the OK button in the Run dialog box.
- Whether you click OK or Browse, you'll see the WinZip Self-Extractor box. This dialog box also tells you the name of the program, Retirement Planner '98 ; which volume you're loading, v3.98.5; and the title, Retirement Planning Made Easy. Three buttons are available: Setup, Cancel, and About. About tells you more about the company and the program. Cancel aborts the whole process and takes you back to your Desktop. Click the Setup button to unzip the file and proceed with loading the program. Since the file is self-extracting, it will unzip itself.
- Once the file is unzipped, you'll see the Retirement Planner Dialog Box. This box contains the licensing agreement and lets you know that by clicking Setup, you're agreeing to the terms and conditions contained in the Readme.txt file. You can click the Read README.TXT button to read the license



You can run a self-extracting, executable file through File Manager in Windows 3.1. Just be sure the version of your file is compatible with your operating system.

agreement, click Cancel to abort the whole process, or click the Proceed With SETUP button to finish loading the program. Press the Proceed With SETUP button.

- The next dialog box is entitled, Retirement Planner Setup. You'll be asked to enter the drive or path containing the Retirement Planner source files. The Install From command line should contain all the information you need: C:\WINDOWS\TEMP\~Wzs3619.tmp. You'll also receive the prompt telling you that to Quit Setup you can press the Exit button. If not, press the Continue button.
- The next dialog box asks if you want to install the test application in a different directory or drive. If you don't want to install the program on your C: drive, you'll need to key in a different one, or if you wish to quit at this point, you can click the Exit button. The command line says, Install To: C:\plan98. When you're satisfied with the drive and file name, click the Continue button.
- You'll receive a message saying, Retirement Planner Installation is Complete! Click OK, and you'll see two icons: Retirement Planner and Read Me.
- Click the Retirement Planner icon to open the application and begin planning.

Another way to load and run an .EXE file in Win95 is through the My Computer icon on your Desktop.

- Put the diskette in your A: drive.
- Open My Computer by double-clicking the icon on the Desktop.
- Click your diskette drive icon, and a dialog box opens with the name of the file: 401k3985.exe.
- Select the file name and double-click. The WinZip Self-Extractor dialog box opens and gives you three choices: Setup, Cancel, or About.

From here, the instructions are identical to opening through Run. Go to step seven and you'll soon be familiarizing yourself with the new application you're working with. ■

by Katie Powers

Stay On Schedule

Software That Helps Organize Your Life



If time is today's most precious commodity, managing time must be the most important skill. Unfortunately, it's a skill many people lack. That's why the market for scheduling software is consistently strong. A wide variety of packages is available to help keep you, your employees, or your events on schedule. Whatever your assignment, from scheduling a coffee break to planning a convention, there is a program on the market to keep you organized. Here's a sampling of the available applications.

■ Organizer 97. If you've ever wished you could transfer the contents of your daytimer to your PC, then you'll appreciate *Organizer 97*, an on-screen datebook. And if you use 3COM's PalmPilot or IBM's WorkPad, you can synchronize *Organizer* to work with these handheld computers.

The tools in *Organizer*—the Calendar, To-do List, Planner, Address Book, Call Manager, Notepad, and Anniversary Reminder—are integrated into the datebook, with tabs marking each. Just click a tab to access the tool you need.

Creating an appointment in your *Calendar* is easy with its two features. One warns you of a conflict if you try to schedule two things simultaneously, plus it lets you make the appointment confidential, a handy feature if you are running *Organizer* for a group (see below). The other feature lets you set an alarm that can signal an impending appointment and announce the end of the time allotted for a meeting or task. *Organizer* also lets you automatically schedule meetings that repeat at an interval.

Using your modem with the Phone menu's Dial command, you can call someone from within *Organizer*. The Call Manager not only records important and frequently used phone numbers, but it also lets you create an incoming calls log that records the time and date of your call, their duration, and what you discussed.

The Planner tool provides an overview of your year. You can highlight the Planner in different colors to show when you'll be busy with things such as conferences, projects, trade shows, and vacation.

You can configure *Organizer* as your personal information manager or for group scheduling with *Lotus Notes* and *Domino*. If the latter is your choice, be sure to use the multiple-calendar view, which lets you display two or more calendars (up to 15) on-screen, provided they are saved for multiple-user access.

■ Outlook 97. Microsoft packed many tools in *Outlook*, which we reviewed as part of *Office 97*, to keep you organized: Calendar, Contacts, Tasks, Journal, and Notes. These tools are accessible in a number of ways. For example, to record a new event, task, or contact, you can choose New from the File menu no matter which application you are in, use the assigned shortcut keys, or use the icons. The Go menu also takes you to any of these tools.

The *Calendar* provides a daily planner, separated into hours, plus a mini calendar of the current month, with today's date highlighted, and the next month. You easily can type events onto the blank lines of the daily calendar.

The *Calendar* screen also includes the *Task Pad*. When you create a task, you can assign it a name, due date, priority level, status, and

percentage completed. Once you finish a task, simply check it off on the Task Pad. Outlook gives you the options of creating a one-time task, a task that recurs at regular intervals (such as your weekly staff meeting), or a task that recurs based on its previous completion.

The Contacts tool is like an electronic Rolodex that lets you record a person's name, company name, address (business, home, or other), E-mail address, World Wide Web site, fax number, and phone number (business, home, pager, cellular, or other). Furthermore, you can keep track of a contact's department, job title, assistant's name, and even anniversary date.

With Journal, you can chart different types of documents along a planner-like grid including *Microsoft Word* files, *Microsoft Excel* documents, phone calls, meetings, and E-mail messages. Each entry in your Journal then acts as a shortcut to that document.

Outlook also offers the electronic equivalent to sticky notes through its Notes tools. You can create reminder notes in different colors and sizes and assign them a category. The notes will remain on your Desktop after you exit Outlook.

Outlook 98, which you can purchase separately, is also available. Some of its new features include a simplified interface with new Find and Organize tools; Outlook Today, which gives an overview of the calendar, tasks, and E-mail messages for the day; and support for synchronization with Microsoft Exchange Server, PalmPilot, Microsoft Windows CE, and WorkPad.

■ Sidekick 98. This version of Sidekick comes with TrueSync technology, which lets you synchronize it with devices such as cellular phones and pagers. With the click of your mouse, the TrueSync Wizard will synchronize your calendar and contact information, for example, with the Franklin REX card, PalmPilot, and Windows CE 2.0 devices, among others.

Even if you won't use its synchronization capabilities, Sidekick gives you plenty of other useful features. EarthTime is a world map that displays the current time in eight locations of your choice, plus a database with information on 540 cities—a handy tool for business travelers.

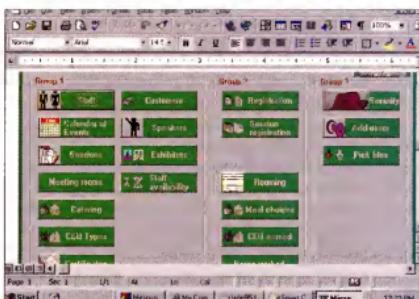
The Calendar includes a To-Do list, Calls list, and Events list—your daily planner. You can view the calendar in a variety of time frames; if you choose yearly, you can take

advantage of scheduling multi-day events in different colors, similar to Organizer 97's Planner. You also can import files from Outlook 97, Schedule+ 7.0, and Organizer 97, plus drag and drop contacts from the Internet using the vCalendar and vCard formats.

With the Contacts tool, you can create card files and then store them in business and personal folders and sort them by criteria such as name, address, and company. If you enter a company's Web site address, just double-click it to jump to the Internet (provided you have Internet access). The Memos tool serves as a word processor, where you can write and format business letters. If you eschew snail mail, Sidekick can send your letter via fax or E-mail from your computer.

The Expense feature lets you log business-related expenses, then totals your expenses in a formal report. The Activities tool is a catch-all feature that tracks all your appointments, calls, and tasks, plus has an Internet Messaging tool. This lets you send notices and collect responses via E-mail for a group event you need to schedule.

Finally, the Call button on your desktop launches the Call Dialer, your calling tool. As



These icons give you quick access to frequently used commands in The Complete Event Manager.

its name suggests, Phone Dialer will place a call for you and let you take notes, keep track of the length of the call, and log a history of calls made to the same person or company.

■ Visual Staff Scheduler Pro 3.0.

With *Visual Staff Scheduler Pro 3.0* (VSS Pro), setting work schedules for your employees doesn't get any easier. Whether you run a small business with just a handful of workers or a large corporation with hundreds of

employees, VSS Pro can help you set their schedules, keep track of their time off, and determine whether you have the right amount of staff slotted for a given shift.

VSS Pro has an easy-to-read, What You See Is What You Get (WYSIWYG) interface, which looks like a worksheet. The employee's name and position are on the left, and the grid of cells, with each cell representing one day, extends to the right. The Quick Action Buttons on the toolbar let you assign or erase a shift and designate time off and on-call status.

A database holds information for up to 200 employees, so if you have more workers than that, you must create more than one worksheet. (NOTE: You can have just one worksheet open at a time.) But because the calendar is perpetual, there's no limit to how far in the future you can schedule your employees.

Before you assign shifts to your workers, you must define four things in the worksheet. First, determine the starting and ending dates of your calendar and what day signals the start of your calendar's work week. Second, enter your employees' names and their titles or positions. If you would like to visually distinguish between groups of workers, insert a divider between the groups. Third, define the hours of your shifts, and assign a name and abbreviation to the shifts. VSS Pro gives you flexibility here, allowing up to 99 undefined shifts, including split shifts.

Finally, create explanations for the various reasons an employee may not be at work. Again, VSS Pro gives you lots of latitude, with 11 predefined and 88 undefined explanations. So whether an employee is at jury duty or on maternity leave, you can see why they are not at work with a glance at the worksheet.

VSS Pro's other notable features are:

- You can choose a password that will restrict access to the calendar. (The multi-user version lets you set a password for read-write and read-only access.)
- You can attach a note to any cell to further explain a worker's shift or absence. Once you have created the note, a tiny box in the cell reminds you of the note.
- The Coverage Watch feature keeps track of the number of workers performing a specific task or working a specific shift.

VSS Pro 4.0 is scheduled for release in the summer of 1998. One of that version's new

features is the ability to publish a schedule as a **Hypertext Markup Language** (HTML, the Web's programming language) document on the World Wide Web or your corporate intranet (an internal network that works like the Web).

■ The Complete Event Manager

4.0. This application lives up to its name, and there's hardly an event it can't handle. If your company schedules such events as conferences, seminars, or trade shows, you can't go wrong organizing all those details with EKEBA International's *The Complete Event Manager 4.0* (CEM).

A pleasant surprise to CEM is that an application this powerful is easy to learn. You easily can figure out how to enter data through the two sets of menus on the screen. The dropdown menu contains categories such as Files, which has the commands you'll need most often; Financial, which is part of the Complete Business Manager (CBM) that comes packaged with CEM; and Preferences. The other set of menus consists of icons that give you quick access to frequently used commands.

EKEBA recommends you spend about two weeks thinking through what types of information you want CEM to manage for your event before you use the application for the first time. One area you'll need to think through, for example, is the "pick files," which are special files into which you enter information you will use repeatedly in data entry (such as titles). Modifying their contents once you've begun will likely affect the uniformity of the event information. In addition, once deleted, files in CEM are not retrievable.

These caveats aside, CEM lets you control just about every facet of your event, including:

- Registering participants for one event or multiple events at the same time.
- Printing personalized certificates for participants, as well as name badges, mailing labels, and sign-in sheets.
- Coordinating schedules for staff and volunteers.
- Managing lodging assignments, including roommate preferences.
- Tracking invoices, receipts, registration fees, account balances, and inventory.

With all the details you juggle in planning big events, it's understandable that you might accidentally duplicate some items. But CEM prevents duplicate data from being entered. Other nice features include CEM's ability to perform mail merges and import and export data from



The Phone Dialer in Sidekick 98 will dial a call for you and keep a record of your calls to the same person or company.

other formats and applications, such as ASCII, *DataEase*, *dBASE*, and *FoxPro* files, provided they are converted first. Furthermore, you can work on any number of events simultaneously. CEM can handle as many events as your hard drive has space to store the information.

Finally, do not worry that scheduling an event for 2000 or beyond means your dates will be messed up. CEM has already solved its Year 2000 problem.

■ WallCHART 4.0. As its name implies, *WallCHART 4.0* is a resource scheduling program that presents your schedules and other information in a format resembling a wall planner. But instead of taking up precious wall space you'd rather reserve for Ansel Adams photos and Dilbert cartoons, you can use it on your laptop or desktop PC and share it on a network, intranet, or via E-mail.

WallCHART gives you latitude in defining the resources (such as people, rooms, and equipment) to work with, the information you want to record with each planned event, and the time frame through which to view your calendar.

The calendar lets you view your bookings according to status or type and configure your time slots. The most handy view option, however, lets you see the calendar from various points of view simultaneously. For example, a college admission office could view its semester lineup by the courses, the classrooms, or from the viewpoints of the instructors, side by side. It will also highlight potential scheduling conflicts and prevents double bookings.

WallCHART also lets you: classify your resources in one or many categories; predefine

a repeatable series of events; attach questionnaires, which you define, to bookings; use the query tool to find a schedule based on one or a number of criteria; print schedules in color or black and white; assign each user an access level that defines and limits the types of booking they can access or change; and export data to other Windows-compatible databases, such as *Excel*.

WallCHART is unique because its installation is on-site by representatives from CL-International, whose clients include the British Broadcasting Corp. and the U.S. Air Force. ■

by Rachel Derowitsch

For More Information:

Organizer 97

\$57 if purchased separately; \$173 if purchased as part of a SmartSuite 97 competitive upgrade
Lotus Development Corp.
(800) 343-5414, (610) 640-9600
<http://www.lotus.com/home.nsf/welcome/organizer>

Outlook 98

\$109 purchased separately; Office 97 users can get a free upgrade
Microsoft Corp.
(800) 426-9400, (425) 882-8080
<http://www.microsoft.com/outlook>

Sidekick 98

\$49.95
Starfish Software
(888) 782-7347, (408) 461-5800
<http://www.starfish.com>

Visual Staff Scheduler Pro 3.0

\$249
Atlas Business Solutions Inc.
(800) 874-8801, (701) 235-5226
<http://www.abs-usa.com>

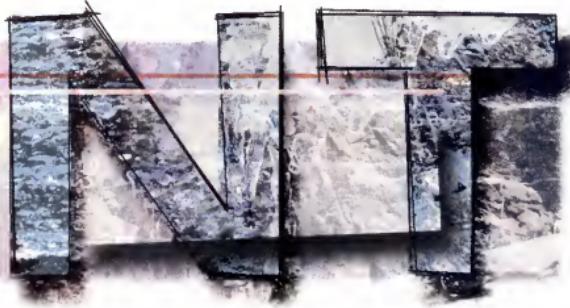
The Complete Event Manager 4.0

\$345.95
EKEBA International
(800) 847-4561, (614) 459-1301
<http://www.EKEBA.com>

WallCHART 4.0

\$1,000 to \$2,000, depending on the number of copies
CL-International
(212) 221-9200
<http://www.clintl.com>

Windows NTro



Microsoft has three siblings in its Windows operating system family: one for portability (Windows CE), one for home users (Windows 9x), and one for business users (Windows NT). You're probably familiar with Windows 95, and you've at least heard of Windows 98 and Windows CE, but unless you've used it in a work environment, Windows NT may be an enigma to you.

The truth is, however, that Windows NT is often simpler to use than its slower, less stable kin. Especially from the user (or client, in a network) side, this powerful operating system is easy to navigate. And, as long as you're not doing a lot of hardware installations or using a portable PC, Windows NT may be an option to consider if you want to upgrade your operating system.

Its Origins. Windows NT, which stands for New Technology, has its origins in the first operating system Microsoft developed. XENIX, an enhanced version of the Unix multiuser operating system, became available in 1980. In 1984, Microsoft continued in the XENIX multiuser tradition with Microsoft Networks, a local-area network (LAN) based operating system. (A LAN is a group of computers, usually in one building or office, physically connected in a manner that lets them communicate and interact with each other.) Called MS-NET, the new operating system

met with little success, but laid the groundwork for the next generation of network operating systems.

LAN Manager, released in 1990, was a cooperative effort between Microsoft and IBM. The two companies parted company, and Microsoft came out with Windows for Workgroups in 1992.

Although Windows for Workgroups wasn't successful enough to usurp the network operating system throne from Novell's NetWare, it set the stage for the first release of Windows NT the following year. By 1996 and version 4.0, Windows NT had established itself as a serious player in the business operating system market.

Features. On the surface, there is little difference between Windows NT 4.0 and Windows 95 (Win95). NT has the same drag-and-drop icon interface and similar folders, and it handles in the same manner. In fact, the only discernible distinction is its noticeable lack of games. (It's a business operating system, remember?) But when you delve into the inner workings of Windows NT, you start to understand why this is the member of the Windows family that corporations use most.

Networking. Obviously, Windows NT is more suited toward client/server networking (a network arrangement consisting of a server, which contains data, and one or more clients, which have access to the server). In fact, there

are two types of Windows NT products: the NT Server and the NT Workstation.

The system administrator uses the Windows NT Server to handle all the server duties for the main machine on the network. These include setting the extended security features and handling multiuser environments. But from the client side, you would mainly be using the Windows NT Workstation. The Workstation is a Desktop operating system with networking capabilities, but it also functions as a standalone operating system.

In addition, both the Windows NT Server and Workstation include Peer Web Services, a program that lets you run your World Wide Web server in a much more reliable fashion than with Win95.

Security. The Windows NT Workstation meets C2 level security guidelines for government applications. This is the lowest level of security as defined by the U.S. National Security Agency. C2 requires the use of logon passwords (not like the easily bypassed Win95 startup logon) and a way to perform security audits. Windows NT also allows administrators to place files and directories off limits to individuals or groups.

Unfortunately, C2 certification is only applicable to computers that aren't on a network (so you are less secure if you're on a LAN), but Windows NT is still much more secure than Win95 or other versions of Windows.

Stability. Most computer users would trade in their mouse for a computer that never crashed. Win95 is notorious for locking up and losing data at crucial periods. This may be acceptable (though still irritating) for home users, but businesses can't afford an unreliable operating system. Windows NT is a good system for businesses because it can protect itself from internal errors and is able to reduce the chance of data loss if there is a crash.

Windows NT segregates individual applications in the PC's memory. That way, if one program crashes, it won't bring down the whole system. Additionally, the many system components run separately, reducing the likelihood of a crash. This separation of system resources means certain programs, such as a game that needs direct hardware control, will not run on Windows NT. But this is one of the glamorous extras sacrificed in the name of a less chaotic operating system.

Power. Benchmark tests from the Business Applications Performance Corp. (BAPCo)



Windows NT 4.0 looks pretty much the same as Windows 95. Can you tell which one is which? Windows NT is on the left.

showed that Windows NT is the fastest-performing Desktop operating system. On systems with Pentium and Pentium II processors and 32 megabytes (MB) of random-access memory (RAM), Windows NT offered as much as 29% higher performance than Win95.

(NOTE: NT's system requirements are higher than Win95's. It's a bad idea to run it on anything slower than a Pentium system with 32MB of RAM and 100MB to 200MB of free hard drive space. But on the other hand, Windows NT manages large amounts of RAM better, so if you have a system with more than 32MB of RAM, Windows NT will run programs much more efficiently than Win95.)

Also, unlike Win95, Windows NT is a true 32-bit operating system. This means it can process 32 bits of data at a time. Win95 claims to be a 32-bit environment but is actually a 16-bit/32-bit hybrid system because of the compromises it makes to maintain backward-compatibility with 16-bit software like you'd use with Windows 3.x (making it much more suited to running 16-bit software than Windows NT).

Although Win95 is able to **multitask** (execute multiple functions simultaneously and efficiently), Windows NT is able to multitask and can execute multiple processes on multiple processors at the same time. So if you have a machine with more than one central processing unit (CPU), Windows NT will make the most of it.

Storage. DOS and Windows 3.x use a 16-bit **file allocation table** (FAT) to handle stored data. The later versions of Win95 and Windows 98 (Win98) use the more efficient FAT32 storage method, but Windows NT has always used its own. The Windows NT File System (NTFS) supports FAT and also provides more reliable ways to protect and recover data.

The Flip Side. So why would anyone not want to use Windows NT? It is the obvious choice for businesses because it is a more stable and secure network operating system. There are drawbacks, however, due to its limited support for adding hardware and power management for portable PCs.

Plug and Play. Microsoft's answer to difficult hardware installations debuted with Win95 as Plug-and-Play technology, but hasn't found its way over to Windows NT yet (see below). Windows NT users must still configure their new hardware's **device drivers**, programs that allow a computer to communicate with peripherals, just like in DOS or Windows 3.x.

Windows NT may have difficulty running 16-bit programs (such as DOS games) that need direct hardware control. Windows NT lacks Win95's ability to circumvent this problem by restarting in MS-DOS mode. Windows NT also lacks support for Microsoft's **Direct 3D**, the real-time, interactive technology used for gaming and other multimedia activities. But it does have OpenGL graphics support, which means **AutoCAD** and other professional design programs will run much more smoothly on Windows NT than on Win95.

Portability problems. Win95 has advanced power management (APM) abilities that let it reduce power to the hard drive, monitor, and CPU during periods of inactivity. This can be especially vital to a notebook user, who may only have an hour or two of battery life. Unfortunately, Windows NT doesn't have APM.

In addition, Windows NT doesn't have any infrared capabilities; another limitation for portable users. And Microsoft Fax, built into Win95, is missing from Windows NT.

There's also the matter of upgrading. If you're running an earlier version of Windows NT, you can move up to Windows NT 4.0, no problem. But if you're using Windows 3.x or 9x and want to move to Windows NT, you'll have to start over and re-install all your existing programs and data.

Windows NT 5.0

Fortunately, many of these features will be showing up in the next version of Windows NT. Version 5.0, due out in mid 1999 (after the typical Microsoft operating system delays), will include Plug and Play and the same advanced power management of Windows 98. Windows NT 5.0 also will feature the "Web integrated" look of Win98 (and Win95 with *Internet Explorer 4.0*).

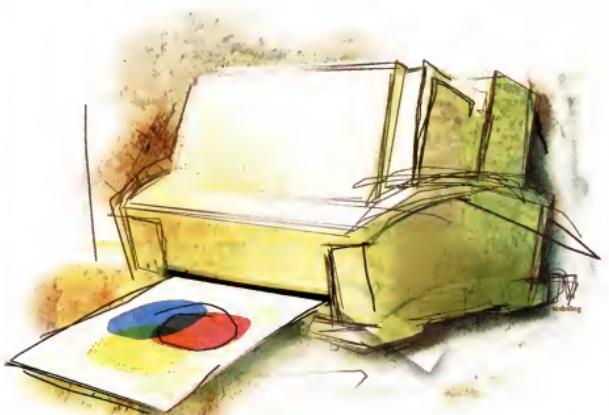
The new features will go beyond the standard improvements in the networking, reliability, security, and performance of the operating system. One of the most useful will be the IntelliMirror PC management technology, which will virtually eliminate the need for a system administrator to visit a client's Desktop. The IntelliMirror will "intelligently mirror" a user's data, applications, system files, and administrative settings on the server machine to aid in remote administration.

There will be some compatibility issues to work through. For example, there will be a major change in the Installation File Format (INF) network files in the new Windows NT version. Microsoft admits that some INF files from Windows NT 4.0 will not work in version 5.0. But with added Plug-and-Play and power management enhancements, Windows NT 5.0 will be hogging much of the attention that the more popular Windows siblings have been getting. ■

by Joel Strauch

Windows NT Workstation 4.0

\$290, upgrade: \$135 (NT users only)
Microsoft Corp.
(800) 426-9400
(206) 882-8080
<http://www.microsoft.com>



The Best In Print

We Review The Latest Laser & Inkjet Printers

Despite all the talk about online communication and dreams of a paperless society, the world is still undoubtedly tied to the printed word—and the printed image, chart, and photo. Many projects aren't official until they're written in ink; many thoughts aren't concrete until tacked up on the bulletin board. All this makes printers one of the indispensable peripherals on every user's desk.

The latest group of printers continues a welcome trend in the market: falling prices intersecting rising quality. As buyers, we couldn't ask for a better scenario. The print quality of inkjet and laser printers in affordable price ranges outdoes that of luxury-class printers of just a few years ago. In such an environment, it's hard to make a bad choice when buying from a major manufacturer. Each printer offers capabilities that users dreamed of only a few years ago, and now they come at reasonable prices. While our reviews make some distinctions among printers, the best way to know if a printer is right for your needs is to go to the store and test it yourself.

Laser Printers

The sharp descent in low-end laser printer prices seems to have leveled off at the affordable \$300 to \$400 range. But as prices plateau, the performance levels continue to rise. The personal laser printers we reviewed all boast six or eight pages per minute (ppm) speeds. They all feature 600 dots per inch (dpi) quality, providing sharp (albeit grayscale) image output. Their footprints (desk space they require) have shrunk to where many of the lasers we looked at are smaller than many inkjets.

■ **How We Tested.** Our test machine was an IBM PC 350 with a 200 megahertz (MHz) Pentium processor with MMX technology, 64 megabytes (MB) of random-access memory (RAM), and Windows 95. For our photo test, we used a 100 kilobyte (KB) Joint Photographic Experts Group (JPEG) image printed from within the *Microsoft Internet Explorer* World Wide Web browser. For the graphics test, we printed two pages of an *Adobe Acrobat* Portable Document Format (.PDF) document printed from within *Acrobat Reader*. Our document test was a 20-page *Microsoft Word* document with a variety of formatting. Reviews appear in alphabetical order.

Hewlett-Packard LaserJet 6L se

This "special edition" of HP's popular 6L model changes little, which makes it a pretty reliable printer for a decent price.

Installation. The LaserJet lacked the handy setup guide that was standard with most of the other printers, but the first few pages of the extensive manual served the same purpose. The entire installation went smoothly. We popped open the printer's cover, dropped in the toner cartridge, and then were ready to print.

The surface of the printer was free of all the switches and buttons that decorated the other printers we reviewed (except for a switch to flip for manual feeding of paper or envelopes). There wasn't even an on/off switch; the printer turned on as soon as we plugged it in.



Features. In addition to the standard printer software, the LaserJet includes the useful *Internet Publishing Kit*. This includes Microsoft Internet software, including a 3.0 version of Explorer, The Microsoft Network, and Internet Assistants for most Microsoft Office 95 applications.

The LaserJet's on-screen status monitor stood out with its ability to really keep you on top of the printing. When you send a document to the printer, the monitor pops up telling you how long it will take to finish printing the job and which page is currently printing. It even provides an animated diagram showing the paper's path through the printer.

Performance. The status monitor was especially useful when the LaserJet jammed up during the document test. This was our only printer to do so, and we had to open it up and remove the toner cartridge to get at the jammed paper. But the manual contained detailed instructions on resolving this and other technical difficulties, so the remedy was quick.

Apart from the paper jam, the LaserJet performed exceptionally well. It was the slowest printer on the document test, but it was faster than most on the graphics and photo tests and produced the best image quality in our test. Overall, the LaserJet 6L is a solid printer that lives up to our expectations of HP quality.



**Lexmark
Optra E+**

The first thing we noticed about the Optra E+ is its small size. We almost lost this thing at our testing station. If you're looking for a desk-space saver, start your printer search here.

Installation. The Optra E+ was our other printer without a setup guide, but it needed even less setup than the HP. The toner cartridge was pre-installed, as was the photo conductor unit. (Apparently, Lexmark printer users once had to install this unit as well with a new printer. Lexmark must have learned the error of this way after a few dozen support calls.) About the only hardware installation we had to worry about was snapping a couple of "feet" onto the side of the paper input tray to add support when using a large load of paper. It should be noted that with these feet removed, this printer folds up tight, making it convenient for transport.

The software installation was more involved. There weren't many detailed instructions about

it, so we had to dig around the installation CD-ROM for a while until we found the appropriate driver for our operating system.

Features. The CD-ROM also included some useful programs, including the ability to create installation diskettes from a CD (always a great feature), a variety of font resources, and software network support for those who plan to use the Optra E+ on a local-area network (LAN).

The Optra E+ has 2MB of built-in memory, the most of any printer we looked at (it tied with the NEC, see below). The manual, although sparse on the software installation info, was highly detailed in every other regard. A full-size (8.5-by-11-inch) book, it contained information on everything from how to clean your printer to how to read the indicator lights for possible error messages.

Performance. But for having all that resident memory, the Optra E+ was slow. For both the photo and the image tests, it clocked the worst times. The photo turned out well, one of the better ones we examined, but the Optra E+ had difficulty with the Adobe Acrobat document. On both pages, there were gaping holes in the page title. For example, page one should read "Explore the Possibilities of Adobe Acrobat 3.0." With the Optra E+, we got "Explore t Acrobat 3.0."

Besides this glitch, which we couldn't eliminate, the Optra E+ performed adequately. The text copy was sharp and the images were clear. It was easily the tiniest printer we tested, winning the small footprint category "feet" down.

**NEC
SuperScript
870**

The SuperScript 870 is smaller than its older sibling from last year, the 860, but it's not going to fit in any pockets. The SuperScript was the largest printer we looked at, but its performance was good and its price tag was low.

Installation. When we opened the SuperScript's box, we were pleased to find a small box on top of the printer that contained the software and installation instructions. This made it easier because we were in for some installing. In addition to having to remove the toner cartridge, shake it up, and then reinsert it (which is easier than installing one from scratch), we had to install the input and the output paper trays.

The software installation involved a couple of bumps. After we had completed the installation and restarted, Windows prompted us for the driver again and installed it for the second time. And after rebooting the PC, we received a message letting us know that the SuperScript's status monitor wouldn't work with our more advanced ECP parallel port. This was nothing serious; we had the choice of either disabling the system monitor or changing the setting on our parallel port.

Features. The SuperScript comes with a significant amount of software. In addition to the Adobe Acrobat Reader, *Adobe Type Manager*, clip art, and *Looking Good on Paper* that come on the installation CD-ROM, you get the NEC Business Value Pack. This package lets you preview five printing programs and then choose one to keep.

Another nice feature is a switch that lets you easily toggle between the two output trays—either face up or face down.

Performance. The performance of the SuperScript was exemplary. The quality of



Size Operating Dimensions

(W x D x H)
Weight

Features

Highest Resolution

Manufacturer PPM Rating

Pages per minute

Memory

Installed (upgradeable to)

Printing Speed As Tested

(Standard Resolution/Plain Paper)

Photo (100KB JPG image)
Adobe Acrobat file (2 pages)
Word document (20 pages)
PPM tested (Word doc)

Price

Street

For More Information

its output was high, and it had the fastest time during our document test and the second fastest times in the graphics and photo tests. We can't say much more than the SuperScript was very close to its promised eight pages per minute (seven-and-a-half pages per minute with our 20-page document).

If space constraints aren't an issue, this is definitely a printer that performs at a price you can afford to pay.

Okidata Okipage 6e



Although the Okipage 6e uses light-emitting diode (LED) technology instead of true laser technology, its performance was on par with the lasers we tested. (LED technology uses a special type of semiconductor that illuminates when an electrical charge passes through it.)

Installation. Like most of the printers we set up, the Okipage was wrapped up with tape like a mummy. But unlike the others, the Okipage had the setup instructions stuck right into it, making sure we couldn't miss them. In addition to these instructions, there was a detailed quick setup guide that walked us through installation.

Features. It was a good thing that the setup guide was comprehensive because we couldn't find the Okipage's manual. After some searching, we located the digital manual on the CD-ROM. While obviously a cost-saving practice, we find it less convenient for users who just want to browse through and see what their printer has to offer. If you don't have a CD-ROM drive, you can get diskettes that contain the printer software by calling an 800 number (a Windows driver diskette does come with it), but we couldn't find anything about what these users would do for a manual.

Also shipped with the printer is a temporary-use copy of Intuit's *QuickBooks* accounting software. It expires after 25 uses, but it's a nice add-on for a business class printer.

Performance. The Okipage's performance on our tests wasn't stellar, but it wasn't bad either. The times were right in the middle of the pack (as is its price), but its quality is up at the top. We had no problems with the output of the Okipage or running the printer. The Okipage is a larger unit (close to the size of the NEC), but it performs well at a decent price.



Xerox DocuPrint P8

The DocuPrint P8 is Xerox's first foray into the low-cost, personal laser printer market, and the company has created a unique model that some of the industry's veterans could learn from.

Installation. There was quite a bit of physical assembly with the DocuPrint, including toner installation and setting up the input and output trays, but this was offset by the fact that

| HP LaserJet 6L se | Lexmark Optra E+ | NEC SuperScript 870 | Okidata Okipage 6e | Xerox DocuPrint P8 |
|---|---|---|---|---|
| 13.2 x 12.3 x 8.9 inches 15.5 lbs. | 13.7 x 9.7 x 8.6 inches 13.2 lbs. | 15.5 x 11.5 x 10.5 inches 17.6 lbs. | 12.6 x 14.2 x 6.9 inches 17 lbs. | 12 x 15.4 x 12.5 inches 10.6 lbs. |
| 600 x 600 | 600 x 600 | 600 x 600 | 300 x 1200 | 600 x 600 |
| 6 PPM | 6 PPM | 8 PPM | 6 PPM | 8 PPM |
| 1MB (9MB) | 2MB (6MB) | 2MB (16MB) | 1MB (17MB) | 512KB (N/A) |
| 35 sec. 45 sec. 3 min. 35 sec. ~ 6 | 1 min. 35 sec. 1 min. 3 min. 20 sec. 6 | 30 sec. 40 sec. 2 min. 40 sec. 7.5 | 40 sec. 55 sec. 3 min. 20 sec. 6 | 20 sec. 35 sec. 2 min. 50 sec. -7 |
| \$399 | \$397 | \$349 | \$369 | \$349 |
| (800) 752-0900 (650) 857-1501 http://www.hp.com | (800) 539-6275 (606) 232-2000 http://www.lexmark.com | (800) 632-4636 (408) 433-1200 http://www.nec.com | (800) 654-3282 (609) 235-2600 http://www.okidata.com | (800) 832-6979 (716) 423-5090 http://www.teamxrx.com |

Xerox included a printer cable with the unit. This is amazingly uncommon for a new printer, but it makes complete sense. Who has a printer cable without a printer? They only cost \$10 or \$15, but it's a nice touch to include it in the price of the printer.

The software installation went very smoothly. With Windows 95, there was only one installation diskette, so in a couple of minutes we had the printer up and running.

Features. On the flip side, that one driver diskette was the extent of the software included with the DocuPrint. But in addition to the included printer cable, the DocuPrint has two parallel ports, letting you share the printer with an additional PC without having to network it.

Performance. Although the DocuPrint had the lowest amount of on-board memory (only 512KB), it started printing faster than any other printer we tested. In fact, it had the fastest times for both the photo and graphics test and the second fastest for the document test.

The output quality was good for the photo test, but we ran into some problems with the Adobe document. The paragraph of text on both pages came out as gibberish every time we attempted to print. All the other printers had noticed that the Adobe pages needed to be printed in Landscape style (horizontally across the page), but we couldn't even force the DocuPrint to print this way by manually changing the settings.

Despite these glitches, the DocuPrint is a great effort from Xerox, providing a fast, high-performance printer at an excellent price.

Inkjet Printers

Today's average inkjet printer is a far cry from its slow, poor printing, smudge-prone ancestors of just a few years ago. Spend \$200 (just above the minimum) and you get a four-color machine that produces beautiful images, stunning graphics, and letter-quality text. And unless you're really trying, it won't smear either. Spend in the \$350 to \$500 range, and you get the same or better print quality, improved print speed, and a duty cycle geared toward the needs of a small office.

Printer prices are low, so the most difficult part about buying a new inkjet isn't so much the

cash factor, but deciding which is the best for your situation. We happily can say that we'd buy any one of the printers in this review. Each one is that good. We can separate the competitors with quantifiable criteria such as print speed and sometimes text quality, but buying decisions often depend on more subjective qualities such as the color reproduction you like best.

How We Tested. We connected each printer to the parallel port of an IBM 300XL system with an Intel Pentium II 300MHz processor, 64MB RAM, and Windows 95. To test each printer's photo-image capabilities we used an image from PhotoDisc opened in *Adobe PhotoShop 4.0*. We enlarged the floral JPEG image to fill an entire sheet of glossy paper and used each printer's highest resolution setting. The image's fine details and subtle color variations made it a perfect test document.

To test ability with standard fare we used a four-slide *Microsoft PowerPoint 97* presentation with a mix of text and colors using plain paper and each printer's normal (or comparable) setting. Finally, to judge each printer at its most common task—printing black text—we printed a 10-page, text-only *Microsoft Word 97* document using the same setting.

\$200 Inkjet Printers. We decided to review printers at the \$200 price point because these devices often tend to be noticeably better than those that fall in the \$150 to \$200 price range. We tested three machines in this category from Canon, Epson, and Hewlett-Packard. Several major manufacturers were between product launches in this category and could not provide printers for this review. Reviews appear in alphabetical order, and comparisons refer to the other printers in the same price category.



Canon BJC-4400

Another good printer from the folks at Canon, the BJC-4400 has excellent print quality at good speeds, and it even offers a special function: You can turn it into a scanner.

Installation & Features. The BJC-4400 is easy to install, and its small footprint and light weight make it a shoo-in for anyone who is cramped for space or expects to move the

printer often. Documentation is generally good. The quick-start guide clearly explains installation of the ink cartridges and offers other useful tips. One weakness is the sparse troubleshooting section in the users manual. Luckily we didn't need it.

Canon's printer driver keeps things simple and offers advice when it can. For example, if you set the driver to do a job one way, but it doesn't have the correct ink cartridges installed to do it, it will tell you.

The BJC-4400 also offers a unique option that might appeal to users contemplating the purchase of a scanner, too. For \$100 you can buy the IS-22 Color Image Scanner Cartridge. According to Canon you just replace your ink cartridge with the IS-22, install the software, and voila—your printer is now a scanner. We didn't get to test the scanner's quality, but it sounds intriguing and should save some desk space.

Performance. The BJC-4400 performed well, printing our photo image faster than either competitor. We lacked the optional photo cartridge (\$40), so the image itself probably wasn't the machine's best, which explains why the image was less vibrant than other test images. We still liked the print job, however, and with good quality and speeds in the other categories and the \$100 scanner option, the BJC-4400 is a good candidate for the average home user.

Epson Color Stylus 600



The Color 600 uses Epson's patented Micro Piezo technology to deliver an astonishing resolution of up to 1,440 by 720 dots per inch (dpi) and can print outstanding images, or knock out some letter-quality text, without breaking a sweat.

Installation & Features. Installation was painless with the assistance of Epson's excellent 35-page setup guide. The user's guide is also top-notch, with plenty of instructions and a 16-page troubleshooting section to help with problems. The most interesting part of the setup process comes after you install the cartridges and the printer buzzes and whirs as it electrically charges the inks. After this noisy, seven-minute process, the 600 is ready. You never need to swap in special photo cartridges here; the 600 uses the same inks for everything.

Performance. We've tested printers from Epson's Color Stylus series before, and they rarely disappoint. The 600 is no exception. This is the printer that made our editor-in-chief, upon examination of its photo output, exclaim "This came out of a \$200 printer?". The photo image was simply the best of the bunch, with near-perfect color gradation, vibrant tones, and attention to details. It offers few clues to its inkjet origins (and without a photo cartridge, too). The graphics were similarly stunning, brighter and more detailed than the competition, and the text was crisp and dark. Speeds varied, as the Epson finished first in the graphic test, second in the photo test, and last on the text document.

Both the BJC-4400 and the HP DeskJet 694C (up next) are worth consideration, but for overall quality delivered at adequate speeds, our low-end category pick is the 600. Inexpensive inkjet printing doesn't get much better.

Hewlett-Packard DeskJet 694C

The Epson scored high with us, but experienced printer buyers know HP's market domination is not just happenstance. The 694C, another in a long line of good products, should appeal to HP owners looking to upgrade, as well as those users looking for a dependable first unit.

Installation & features. The toughest part about installing the 694C is finding the desk space. The 694C's dual front-tray design makes it the largest of our \$200 printers. The rest of the installation process went well. That's fortunate since our printer arrived without a setup guide or manual. That's probably a press evaluation unit snafu, and not a common occurrence in retail sales. Installing the dual inkjet cartridges is easy, as



is swapping out the black cartridge for the optional photo one (\$42). The 694C walks you through an alignment process to make sure everything lines up, and then it's time to print.

Performance. Using its optional photo cartridge the 694C's photo output featured some of the darkest, richest colors of the bunch, which is to some people's liking. Those dark colors obscured some of the details in our image, however, and we also noticed some banding in the brighter areas. The 694C's graphics and text (printed with the regular three-color and black cartridges) were good, but no match for the Epson's. As for speed, it proved to be a bit slow, coming in last in the graphic and photo tests, and second behind the Canon on text. We found the 694C a capable, if not thrilling, printer for the home.

Test Results

| | Canon BJC-4400 | Epson Stylus Color 600 | HP DeskJet 694C |
|-----------------------------------|---|---|---|
| Size Operating Dimensions | | | |
| (W x D x H) | 15.1 x 9.1 x 8 inches | 16.9 x 9.1 x 6.1 inches | 17.2 x 16 x 11.7 inches |
| Weight | 7.7 lbs. | 11.5 lbs. | 11.6 lbs. |
| Print Resolution (dpi) | | | |
| Highest Color Resolution | 720 x 360 dpi | 1,440 x 720 dpi | 600 x 300 dpi |
| Highest B & W Resolution | 720 x 360 dpi | 1,440 x 720 dpi | 600 x 600 dpi |
| Manufacturer PPM | | | |
| Black & White | 6.5 PPM | N/A | 5 PPM |
| Color | 2.5 PPM | N/A | 1.7 PPM |
| Print Speeds As Tested | Normal (or comparable) setting (unless noted) printed on plain paper | | |
| PowerPoint Presentation | | | |
| Four slides (two text, two color) | First Page Out—1:07; total—3:27 | First Page Out—:37; total—2:20 | First Page Out—1:27; total—4:03 |
| Microsoft Word Text Document | | | |
| 10 pages total | First Page Out—:37; total—5:12 | First Page Out—:35; total—5:33 | First Page Out—:35; total—5:14 |
| 1.8MB JPEG Photo | | | |
| Highest resolution, glossy paper | 10:55 (without photo cartridge) | 12:52 | 16:22 |
| Ink Cartridge Costs | | | |
| Black | \$29; \$8 (tank only) | \$22 | \$25 |
| Color | \$49; \$21 (tank only) | \$25 | \$28 |
| Special Photo Colors | \$40 | N/A | \$42 |
| Price | | | |
| Estimated Street | \$199 | \$199 | \$199 |
| For More Information | | | |
| | (800) 423-2366; (714) 438-3000 http://www.ccsi.canon.com | (800) 463-7766; (310) 257-4001 http://www.epson.com | (800) 637-7740; (650) 857-1501 http://www.hp.com |

■ \$350 to \$500 Inkjet Printers.

Printers in this category should appeal to users who plan to do more than the occasional print job at home. In addition to the qualities mentioned above, these serious units offer networking capabilities through optional add-on servers, and Epson offers a sister product to our review unit that comes with a built-in server.



Alps MD-1000

It might seem odd to begin this category of inkjets with one

that doesn't exactly use jets (the inks are on tape). We've heard about Alps' Micro Dry printers for a long time, and the MD-1000 fit in this price range, so we tried it. We found a printer with capabilities that will attract some inkjet users, and limitations that might repel others.

Installation & features. It's a good thing Alps throws in a four-page Quick Start Guide. This is unlike any printer we'd seen. Once you know what you're doing, you open the front cover and place the special Micro Dry ink cartridges in a tray inside. A single carriage will come by to pick them up, one at a time, during printing. Alps also includes a fabulous 147-page users guide that explains how to use the various ink selections.

Performance. Watching the MD-1000 do its thing is quite a sight. With only one color cartridge, it must run a sheet of paper through, roll it back in, and repeat the process with the next color. The process works very well, producing dry print that won't smear or fade. The problem is it's very slow, especially on text production.

As for quality, we used the three color cartridges and a finish cartridge combination (designed to give a photorealistic finish) to print our photo. The final product was good, but seemed a little washed out (No true black?), and the finish cartridge left lines noticeable when viewed at an angle. We replaced the finish cartridge with a black one for the graphic test and found good results. Despite a long wait, however, the MD-1000's best print job was on text, offering some of the best we've seen. Overall, this is a good printer for users looking for something a little different.



Canon BJC-7004 Photo

The latest Canon printer boasts two new technologies that the company says

make it the one to beat. We liked what we saw, but got hung up on slow print speeds.

Installation & Features. Installation is simple, and Canon once again offers plenty of documentation. As with the BJC-4400, the company offers very little in the way of troubleshooting tips. We didn't need many because we ran into few problems, besides a few paper handling errors.

Canon's new technologies are Plain Paper Optimized Printing (P-POP) and Bi-Level printing. Canon says P-POP creates a sharper, more water-resistant product, while the Bi-Level printing cartridge adds photo versions of the color inks (cyan, magenta, and yellow) for a total of seven different inks in the mix. A nice extra feature lets you replace just the individual ink tanks when they run dry, instead of the whole cartridge, which should save you some cash.

Performance. All that technology adds up to some pretty good output, but a darn slow printer. The photo image it produced offered some of the best colors around with the whitest whites and colorful reds. This Canon also took the longest to produce the image, even longer than the Alps, which lays down its ink one color at a time. Cranking out our graphic presentation was equally slow, and the text printing didn't set any records either. We ran the printer through tests on several settings, and it seems the only way to speed things up is to print on the draft setting, which isn't always desirable. The BJC-700 offers quality output; we just couldn't figure out why it was so slow.

Epson Stylus Color 850

Epson continues to impress with its fine line of Stylus Color printers, and the 850 raises the bar again by offering the same consistent strong production at much improved speeds. The company

claims the 850 prints 20% faster than its predecessor, the 800.

Installation & features. Epson makes life easy with simple installation and plenty of manual to walk you through any process that isn't self-explanatory. An ample troubleshooting section offers solutions to most common problems you might encounter.

The 850's amazing 1,440dpi makes special photo cartridges unnecessary, which is nice. Another handy feature is the status monitor that lets you know how much ink you have in your cartridges. It saves you from worrying about running out at the wrong time.

Performance. Like its less expensive sibling, the 600, the 850 offers stunning photo, graphics, and text reproduction. It just does it faster than the 600. The 850's photo reproduction was mid-range in terms of colors. It didn't appear too washed out, and it wasn't

Size Operating Dimensions

(W x D x H)
Weight

Print Resolution (dpi)

Highest Color Resolution
Highest Black & White Resolution

Manufacturer PPM

Black & White
Color

Print Speeds As Tested

PowerPoint Presentation
Four slides (two text, two with color)
Microsoft Word Text Document
Ten pages total
1.8 MB JPEG Photo
Highest resolution, on glossy paper

Ink Cartridge Costs

Black
Color
Special Photo Colors

Price

Estimated Street

For More Information

too dark, that puts it close to where it should be, in our estimation. Graphics and text are also good, although nobody's text can match the Alps in this category. As for speed, the 850 offered excellent times on all our tests, finishing first on the photo and the graphic documents, and second, behind the HP, on text. Overall, the 850 is a great printer that promises to serve well in any home or small office, and it (along with the following printer) is one of our two favorites in this category.



HP DeskJet 1120Cse

HP's public

relations team opted to send us the 1120Cse, a printer that handles paper sizes up to 14 by 17

inches. In addition to its copious paper-handling capabilities, the 1120Cse offers great production quality and speed, and despite a much higher price tag of about \$500, it's at the top of our list along with the Epson.

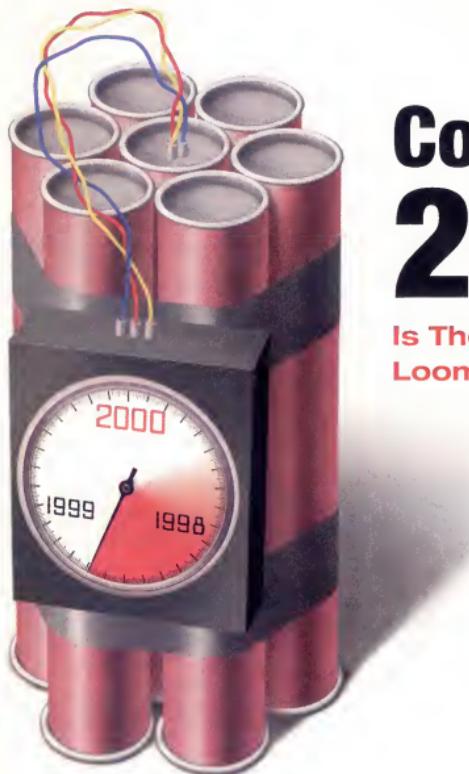
Installation & features. We sound like a broken record, but unless you run into some weird problem, installing today's inkjet printers really is easy. OK, we can run into a weird problem with the 1120Cse. Our installation disc arrived with a crack in it. Since we couldn't get another from HP, we downloaded the correct driver from the company's World Wide Web site. We joked earlier about the large footprints of HP's printers, and this printer's footprint is larger than most because it handles such large sheets of paper.

Performance. Size isn't everything as the 1120Cse also excelled at print quality and speed. Its photo image was the favorite of

many who reviewed the bunch, offering the darkest, richest colors (sometimes at the expense of details). The graphic reproduction was the best, offering vibrant colors and very little grain. The text was also good, right behind the Alps. In terms of speed, it matched up well across the board with the fastest text print time and second fastest photo and graphic times behind the Epson. The printer's great print quality and speed, along with its additional paper-handling capabilities, make it an excellent candidate for graphics artists and others who need quality reproductions and who don't confine their documents to 8.5-by-11 inch pieces of paper. ■

by Joel Strauch and Tom Mainelli

| Alps MD-1000 | Canon BJC-7004 Photo | Epson Stylus Color 850 | HP DeskJet 1120 Cse |
|--|---|--------------------------------------|--|
| 17.68 x 10.02 x 7.48 inches 9.5 lbs. | 18.4 x 12.3 x 8.6 inches 14.1 lbs. | 18.7 x 24 x 12.4 inches 14.3 lbs. | 22.8 x 26.3 x 8.8 inches 20.7 lbs. |
| 1,200 x 600 dpi 1,200 x 600 dpi | 1,200 x 600 dpi 1,200 x 600 dpi | 1,440 x 720 dpi 1,440 x 720 dpi | 600 x 600 dpi 600 x 600 dpi |
| N/A N/A | 5 PPM 3.5 PPM | N/A N/A | 6.5 PPM (8.5 x 11) 4.5 PPM (8.5 x 11) |
| Normal (or comparable) setting (unless noted) printed on plain paper | | | |
| First Page Out—2.35; total—7.52 | First Page Out—4:18; total—14:45 | First Page Out—.22; total—1:04 | First Page Out—1:12; total—3.18 |
| First Page Out—1:31; total—14.36 | First Page Out—.39; total—6.22 Using Test Setting | First Page Out—.23; total—2:52 | First Page Out—.22; total—2.38 |
| 12:28 | 12:56 | 9:10 | 10:36 |
| \$7 \$7 (per color) \$12 (per color) | \$34 \$32; \$19 (tank only) \$466; \$27 (tank only) | \$26 \$26 N/A | \$25 \$30 N/A |
| \$350 | \$350 | \$360 | \$600 |
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Countdown To 2000

Is The World Ready For The Looming Computer Crisis?

country best-prepared for 2000, but the Y2K report card at crunch time still shows a world shockingly behind schedule for fixing a problem we've seen coming for years.

■ **The New Year's Price.** Replacing entire networks costs a considerable amount of money, not just because the old system is physically being replaced, but because all the data from the old system must be entered into the new system. If you're a credit card company with millions of customers, that translates into a major, costly undertaking.

Not preparing for the Y2K bug, however, could be more costly. Some systems will crash. Any number of erroneous calculations will be made, which could result in you receiving a bill with 100 years of interest tacked onto it (or you might discover that your savings account has accrued 100 years worth of interest—the Y2K bug goes both ways). In any case, there's trouble for large, medium, and small companies bitten by Y2K.

Lou Marcoccio, Year 2000 research director for the Gartner Group, says businesses and governments will spend \$300 to \$600 billion to fix their Y2K woes. But despite the huge spending, the Gartner Group anticipates that only 50% of companies around the world will get their *mission-critical* systems prepared for Jan. 1, 2000. Note that the figure doesn't cover all their systems, just the absolutely necessary ones. Many companies won't even be that prepared. "We expect between 30% and 50% of all companies worldwide will have at least one mission-critical solution failure," Marcoccio

There's a clock ticking, and when the countdown is over, you're gonna' know it. You may be unaware of this countdown. You may have never heard of the Year 2000 bug—commonly referred to as the Y2K bug, or the millennium bug (yes, we know the millennium doesn't start in 2000, but that's the bug's name). But you will experience its side effects on Jan. 1, 2000, and for a long time afterwards.

The Year 2000 bug is a painfully simple, yet insidiously difficult, problem affecting computer systems all over the world. In case you haven't been paying attention to the news for the last year, here's the summary: Back in the '60s and '70s computer systems were about as large an R.V. Yet they could store only a small amount of information. (We can store far more on a single CD-ROM.) So, to save valuable

storage space when designing computer programs, programmers took shortcuts. One such shortcut (a very popular one, as fate would have it) was to include only the last two digits of the year when a date was required. Thus, Aug. 18, 1972, would be stored as 08/18/72. Two digits saved were two digits earned, as far as the programmers were concerned.

But when the date rolls over from 99 to 00 (1999 to 2000), chaos ensues. The computer interprets the last two digits as 1900 instead of 2000. Obviously, this leads to errors whenever a calculation involving a date occurs. Programmers were aware of this potential problem from the beginning, but assumed that as technology improved, companies would replace their systems with new computers and programs unaffected by the glitch. They were wrong. Analysts say the United States is the



Countdown To 2000



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never heard of the
commonly referred to as the
millennium bug (yes, we kno
doesn't start in 2000, but
name). But you will experie
on Jan. 1, 2000, and for a long

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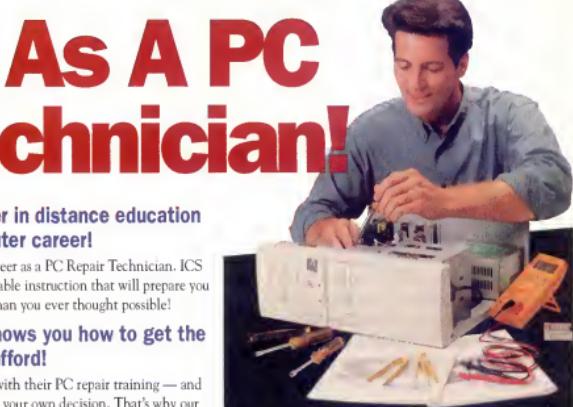
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says. Mission-critical failures mean lost revenue, and many companies will go out of business because they weren't prepared.

The situation in the United States is less dire. Marcoccio says the number of businesses that will experience mission-critical failures decreases considerably in the United States. Large companies are, for the most part, going to be ready for 2000. "About 20% to 50% of [large companies'] mission-critical code has been remediated at this point," Marcoccio says, although much of this code is untested.

Even the U.S. government, frequently criticized for dragging its feet on important issues, is doing a respectable job of revamping its computer networks. Marcoccio says that about one-third of U.S. government offices are doing a good job of tackling the problem, one-third are a little behind, and the remaining third are seriously lagging. He says departments that deserve credit include the Department of Commerce, the Social Security Administration, and the Veterans Administration. Marcoccio would not comment on departments that are falling behind in their Y2K preparations, but other sources have indicated that the Federal Aviation Administration, Department of Defense, and Internal Revenue Service are among bodies that may not be ready.

Canada is running a close second to the United States in dealing with Y2K, but no one will be getting a prize for third. Western European governments and companies, as a whole, are about six to eight months behind the United States in terms of fixing their Y2K problems. Eastern Europe is at least a year behind, as are most Asian and South American countries.

Light In The Tunnel. In the midst of these dreary numbers, however, are indications that some progress is being made. Marcoccio says about 23% of companies worldwide have yet to address their year 2000 problems. "But it's improved quite a bit," he says. "10 months ago, 11 months ago, that number was 50%, so things are improving."

That last 23% of companies are in for a struggle. We asked Marcoccio if it was too late for companies that hadn't started resolving their Year 2000 issues. "Absolutely," he says.

In a global economy, the economic impact of the Year 2000 bug will strike globally. The Gartner Group predicts that the stock market, interest rates, and total cost of goods will be adversely affected because of the lack of preparation for the problem. Marcoccio says there also will be a recessionary effect. Trying to predict

what degree these areas would be affected, however, is foolish. There simply is no way anyone can predict with any degree of accuracy the economic fallout from the Year 2000 crisis. There are too many variables to consider.

The predictions may make you shudder, but don't expect the end of civilization, particularly if you live in the United States. Marcoccio says the overall effects of the Year 2000 bug will be relatively minor (economic worries aside), particularly where large companies are concerned. "We're going to see more effects down at the local levels, the cities and towns," he says. This could cause screwed-up traffic lights,

interrupted power supplies, and other inconveniences. These are real problems that definitely won't make your day, but they will be resolved.

The simple nature of the Y2K problem is maddening. A mere two digits in computer code will cost the world hundreds of billions of dollars to fix, and countless more in lost revenue and economic adversity. It's going to be a long day, Jan. 1, 2000. And we're going to feel the effects of the Y2K problem for a while. As Marcoccio says, "This is going to be a much longer, drawn out issue, unfortunately." ■

by Michael Sweet

Can Your Software Handle 2000?

The Year 2000 problem is widespread, but it probably won't reach your home computer. The bug is limited almost entirely to large, older mainframe computer systems and networks. Designers of off-the-shelf software are very aware of the problem, and for the most part, these products should be Year 2000-compliant.

However, some applications, particularly older ones, could still cause Year 2000-related problems. Typically, these programs are ones that use a lot of calculations based on dates or have a built-in calendar that only stores the last two digits of the year. Many of these software titles have newer versions that will be unaffected by the problem, so a simple upgrade could be the answer.

If you're unsure whether your software is ready for the big new year, you must go to the source. Most software manufacturers are putting a Year 2000 section on their World Wide Web sites to answer questions regarding their products' readiness for the Year 2000. If there is a problem with a particular software title, the manufacturer may offer a patch to fix the problem (a patch is a downloadable file that fixes software problems when it is installed).

Microsoft, for example, has an extensive Year 2000 section on its Web site at <http://www.microsoft.com/y2k>. Here, you can check whether a specific Microsoft product is Year 2000-compliant. Or, you can download the entire list of Microsoft products that have been tested, to see what level of compliance they're at. Microsoft breaks down its levels of compliance into three major categories: compliant, compliant with minor issues, and not compliant. If a Microsoft product is listed as compliant, you should encounter no Y2K issues with that product.

Products listed as compliant with minor issues should be OK for the most part, but there may be specific situations in which a Y2K-related error could occur. Look up the specific product on Microsoft's Y2K page for a list of what Y2K problems can occur with the product and possible solutions to the problem. Some examples of applications that are compliant with minor issues include *Internet Explorer 4.0* (32-bit version), *Publisher 97*, *FoxPro 2.6*, and *Office 95* (Professional and Standard editions).

Microsoft only lists three products as not compliant: *Access 2.0*, *Word for DOS 5.0*, and *Office Professional edition, version 4.3* (*Access 2.0* only). If you're using any of these products, it's time for an upgrade.

When the Y2K bug hits the fan, you'll have enough things to worry about in society in general without having to wonder whether your software will function properly. You'll probably be in the clear, but it doesn't hurt to check. □

PC Speaker Roundup

Our Review Finds Systems That Sound Like Winners



You wouldn't expect to see speakers attached to a PC in most office environments. Many office PCs don't even have the internal sound card needed to produce sound. But speakers are beginning to filter into the office environment as sound goes to work.

One of the main reasons for this change is videoconferencing, a compelling reason to bring speakers into the workplace. This technology that lets PC users see and talk to each other in real time is still evolving to a point of practicality, but it's getting close. Videoconferencing with desktop PCs and the Internet is an efficient way to communicate with several business partners and contacts at once, regardless of their respective locations.

Anyone who prepares multimedia presentations, or uses multimedia in some office applications, needs a good set of speakers to get the most from the experience. Multimedia elements are becoming common in all types of applications, spanning both the personal and business worlds. Multimedia is also a major force on the World Wide Web, with audio becoming increasingly common on Web pages. For example, you can view a prerecorded seminar online, view and hear live Web broadcasts, or listen to the latest news on an Internet radio station.

When you're looking for speakers, you'll want a system that's thrifty with the desk space, but generous with the high-quality sound. The best way to achieve this is with a

three-piece speaker system, which consists of two small satellite speakers and a subwoofer. You place the satellite speakers on the desktop or mount them on the sides of your monitor. The subwoofer, which can be quite large, usually rests under the desk. The bass is channeled through the subwoofer, giving the sound greater depth and power.

You may notice that satellite speakers are magnetically shielded. The magnets in speakers give off electromagnetic energy, which would cause distortion on your PC's monitor without shielding. Many subwoofers are not magnetically shielded, but this shouldn't be a problem because most subwoofers will be placed far enough from the monitor to prevent interference.

For this review, we looked at units from several popular PC speaker manufacturers in a price range from about \$60 to \$250 to give you an idea of how products differ throughout that range. The units we reviewed, all three-piece systems, include the Altec Lansing PowerCube Plus, the Creative Labs MicroWorks (made for Creative Labs by Cambridge SoundWorks), Midiland's Forzando Plus, and Jazz Inc.'s J-7901. (Speakers from another major manufacturer, Labtec, arrived too late for review.)

Creative Labs

Price: \$249.99

Creative Labs knows a thing or two about the marriage of sound and PCs. After all, the company is the leader in the PC sound card business. So it seems reasonable that Creative Labs would provide a good set of speakers to go with its high-quality cards. Enter the MicroWorks three-piece speaker system, specially designed by Cambridge SoundWorks for Creative Labs.

The MicroWorks system consists of two small satellite speakers and one hefty subwoofer—the largest in our review. The satellite speakers sound much bigger than you'd expect from their tiny appearance. They take up virtually no desk space, yet deliver a full, powerful sound comparable to that of the Altec Lansing speakers. These speakers produced slightly more noise than the Altec Lansing speakers, however, when we played an audio CD. Still, Cambridge SoundWorks proves that big things come in small packages.

Big things come in big packages as well, as we noticed when we cranked up the subwoofer. This big box o' sound really thumps out the bass, as you'd expect. If you like bass, you'll love this desktop-rattling subwoofer.



Altec Lansing's PowerCube Plus system adds convenient controls and automatic volume adjustments to its core strength: quality sound production.

Connecting these components, however, is not as slick as with the Altec Lansing or MidiLand systems (coming up later). You'll have several wires to connect between the speakers and subwoofer. The wires are color-coded, which makes the task a bit easier. But the leads of the wires are exposed, meaning you must twist them before inserting them, otherwise they could become frayed and compromise the sound quality. This isn't a big deal, really, but it means a couple of extra steps when you're setting up the system. We didn't like the fact that the volume control is placed on the wire between the sound card and the speakers, either. It's less practical than having the volume controls on the speakers themselves, in our opinion.

Still we consider this a worthwhile system, as far as sound quality goes, though its higher price stands out from the pack.

Altec Lansing Price: \$149.95

We reviewed several good speaker systems in this roundup, but Altec Lansing's unit was our favorite. The sound quality was good and they had an attractive design. The volume and power controls are cleverly placed on the top of one of the desktop speakers. Having the volume controls close by is a must, but this particular design includes the bonus of good looks.



Creative Labs, a big-time name in PC sound, presents some big-time bass with the MicroWorks system's hefty subwoofer.

Setup is also a cinch, which will be a relief to those who want quality sound, but don't want to become audio engineers to set it up. We had the speakers up and running in less than three minutes. The hassle-free setup will be a bonus to those who need to transport their speakers for presentations or demonstrations.

The satellite speakers don't take up much space, but they really punch out high-quality sound. The CD music we listened to sounded better than we heard through any other pair of speakers, although there was a hint of background noise. The sound from the other applications we ran was squeaky clean, without a hiss. We were impressed with the big, clear sound coming out of this unit. You won't be disappointed with these speakers, whether you're using them for a multimedia presentation or enjoying a little guilty pleasure by playing your favorite game.

The subwoofer is something to crow about as well. It's fairly sizeable as far as PC subwoofers go, but it still should easily fit under your desk or table. It provides a wonderful deep bass that complements the speakers well. The subwoofer has a nice booming resonance that is indeed gratifying. One of the nice extras is that adjusting the volume on the subwoofer causes the volume of the desktop speakers to adjust automatically so the volume remains in balance.

MidiLand Price: \$99.95

MidiLand's Forzando Plus three-piece speaker system is a decent setup, with satellite speakers about the size of Altec Lansing's. The subwoofer, however, is small in comparison to the first two units.

This system, again much like Altec Lansing's, was nearly effortless to install. There's no special preparation of the wires involved, as with the Creative Labs system. Just plug the speakers into the subwoofer and the subwoofer into your PC's sound card and an outlet, and the system's ready.

The system's design is not particularly awe-inspiring. The volume, subwoofer volume, 3D Sound, and power control buttons are located on the front of one of the speakers for easy access. The compact subwoofer should fit comfortably under nearly any desk.

We were a bit surprised when we began our CD audio sound test because the sound was flat, and not very loud, considering how high we had turned up the volume. Then we pressed the 3D Sound button. The sound became fuller, wider, and noticeably louder. The satellite speakers were adequate, although certainly not jaw-dropping. The subwoofer also didn't seem to kick out as much power as the Altec Lansing



MidiLand's Forzando Plus setup is a little weak on the sound production, but there's always that cool 3D Sound option.

or Cambridge SoundWorks systems. Then again, the MidiLand subwoofer is not nearly as monstrous in size as those systems, and this system with a price of around \$100 is aimed at the more budget-minded buyer.

We ran some more tests and found that the sound quality was a little better in Windows applications than when we simply played an audio CD through the computer. Then our curiosity got the best of us. We wanted to see whether the 3D Sound would deliver as advertised, so we popped in a game and gave it a whirl. Again, there was a significant boost to sound quality when the 3D mode was activated, but we can't say that we were actually hearing sounds in a truly three-dimensional environment. It did seem like we would hear things off to the extreme left and right, but not above or behind us. This isn't entirely surprising; true three-dimensional audio is difficult to achieve.

We put these speakers in the economy class section. They're not bad, but audiophiles will

be disappointed. If you need really big sound, you'll need to look elsewhere.

Jazz

Price: \$59.95

Jazz Inc. sent us what was by far the most interesting-looking system. The satellite speakers looked more or less like any other pair, but the covers were oval-shaped and placed at an angle, making us feel like Spider Man was staring at us. The subwoofer has a unique design, indeed. From the front, it looks as though it's being sucked into itself. It's about the same size as the MidiLand subwoofer, and the satellite speakers are almost exactly the same size as the Altec Lansing speakers.

One thing we have to question is Jazz's decision to place the controls on the subwoofer. It seems that a subwoofer should be nicely tucked away by your toes. If that's the case, it's going to make adjusting the volume and other controls a pain—especially considering that many PC users are not, um, svelte in nature. Unless you're especially dexterous with your toes, you probably won't appreciate Jazz's avant garde design. We do think Jazz's design is creative, and this system won't eat up a lot of space. But form should follow function. At least the system was easy to install.

We put on an audio CD and initially didn't like what we heard. This is another system that incorporates "3D audio" technology, so we pressed the 3D Sound button. As with the MidiLand system, we noticed a significant increase in sound quality. However, we still thought the sound could have been a little better. The sound quality improved much more, however, when we switched from audio CDs to Windows sound files. It was still a little hollow and not very immersive compared to the other systems we tested.

When we switched to a Windows program, we noticed an increase in sound quality. The subwoofer was better than MidiLand's, although it couldn't hang with Altec's or Cambridge's. The satellite speakers sounded pretty good, though. Once again, the 3D sound option proved to be an exaggeration, as it almost always is.

This is another example of a speaker system that won't give you the ultimate in sound, but is a good alternative for those who want respectable performance at a good price.

With all the emphasis on multimedia in computing, it doesn't make sense to handicap yourself by not having speakers on your PC at work. PC sound is moving from the realm of



Only the limber need apply to use the Jazz J-7901 system, which sticks its controls belowdecks on the subwoofer.

entertainment into the realm of business. It's a tool, like video and the Internet. Make sure your audio toolkit is complete with a good set of speakers. ■

by Michael Sweet

For More Information:

Altec Lansing
(800) 258-3288
(717) 296-4434
<http://www.altecmm.com>

Creative Labs
(800) 998-1000
(408) 428-6600
<http://www.soundblaster.com>

Jazz Inc.
(626) 336-2689
<http://www.jazzspeakers.com>

MidiLand
(888) 592-1168
(732) 254-7809
<http://www.midiland.com>

PC Headphones: Not So Special

Sometimes when you're at work you need a little kickstart. Something to put you in the mood to tackle that next stack of reports, or put a smile on your face as you're preparing for a meeting. Music is often just the catalyst one needs to brighten up the day. Whether it's Mozart or Muddy Waters, Harry Connick Jr. or K.C. and the Sunshine Band, a little music can go a long way to keeping your spirits up at work.

But not if it's someone else's music. When you're working in an office, you need to be considerate of your coworkers (not everyone likes Yanni as much as you). If you're going to listen to tunes on your PC, or even business-related audio like the keynote speech from last week's conference, shut off the speakers and don the headphones.

Some companies, such as Labtec, sell headphones specially designed for the PC. Does that mean they incorporate some

engineering wizardry that makes your little disc sound like a 64-piece orchestra is parked inside your computer? No. PC headphones aren't really all that different from regular headphones. They don't incorporate special technology that makes them vastly superior to a regular pair of headphones. They even use the same connectors found on traditional stereos and their headphones.

Your best bet, when shopping for headphones, is to try before you buy when possible. Sound quality will certainly vary among both PC and normal headphones. Also, make sure you find a pair that fits comfortably, as wearing ill-fitting headphones for an extended period of time can cause sore ears.

When you pick the right pair, headphones in your desk can help those dreary days when you need a little pick-me-up. Just try not to whistle while you work. □

They Write The Software

Modern Programmers Must Know The Code—& The Customer

Unless they're related to one, most computer users don't know much about programmers. If anything, the average person probably holds one of two radically different stereotypical views. The first, no doubt propagated by some programmers themselves, is that of a mover and shaker who understands the strange, new language of computers and is blazing new trails in an exciting, vital, and intensely competitive field. The other, decidedly less flattering take, is of a pale-skinned guy in Coke-bottle glasses and ill-fitting clothes who spends hours staring at a computer screen typing in nonsensical letter and number combinations.

As with most stereotypes, neither of these images is particularly accurate (although real-world examples of both no doubt exist). The fact is, programmers are people just like the rest of us; they just happen to have the ability, training, and disposition to create the programs that make the computer world go 'round. And yes, a growing number of programmers are women.

Last month, in the first article of a three-part overview of the computer industry, we looked at some of the most powerful companies in the business and how those entities' actions can affect the average computer user. This month we move in for a closer look at the people who make the software that makes computers work.

■ What Does A Programmer Do?

Knowing that programmers are just like you



and me is great, but it doesn't really clarify what they do for a living. For starters, we should point out there are two types of programmers: application and system. The majority of programmers, and the ones we'll generally be discussing, are the **application programmers** who

create software (we'll refer to this group simply as programmers). **System programmers** are less common and usually work for big organizations to keep large-scale systems (from mainframes to networks) up and running.

Now for the description: To put it simply, a programmer writes source code using a programming language. Source code is a set of instructions that explains what a program must do; programming languages are artificial languages, created by programmers, that have their own specific capabilities, grammar, and

syntax. Once programmers complete the source code for a program they run it through software called a **compiler** that translates it into the **object code** (or **machine language**) a computer understands.

Confused yet? Peter Harris, president of software company ADPAC and a programmer for more than 50 years, offers another angle. He says programming is the process of explaining a detailed procedure, and he uses the example of explaining the inner workings of a clock. "If you were to explain the mechanics of how a clock works, you'd have to sit down and say, 'First you have a spring, and you have to wind the spring, and that's where these gears get their drive.'" A programmer is essentially explaining, down to the minutest detail, the tasks a computer must perform in order for a program to operate.

■ Good Programmers.

Once this process of explanation is complete, and the programmer works out all the **bugs** (flaws in the programming), you have an operational program. Whether it's a specialty application created by a sole programmer for a single business, or a general use program designed by dozens of people and shipped to millions of users, it all works essentially the same way. From the

minds of a small population of people come the instructions that operate the computers that play such a large role in our lives.

Most experts agree that figuring out exactly what it is that makes somebody a good programmer is a tough task. Generally speaking,

it's a person who thinks logically and sequentially. In the past, it also helped if they were self-motivated enough to work with very little supervision. That's because for many years big companies often hired a programmer, gave them an orientation and a program to write or modify, and then turned them loose, says ADPAC's Harris. Many companies even fostered direct competition between programmers. While this approach offered some advantages, it also created hostile work environments and muddled, get-it-done-now-or-else approaches to program creation.

"You had no programming standards as a result," Harris says. "Think of it as building a small radio where you give the guy all the diodes and cathodes and tubes and resistors, and he builds the radio all by himself. Well, how would you like to try to maintain that radio two years after he leaves?"

As a result of these problems, many companies are changing to group project-driven programming assignments where people work as a team using standard practices. That means some folks, who came up during the era of competition, must learn to play nice. It's not always easy for them, but in the end it seems to be a better system. Today, team players are more likely to be happy as programmers.

Another important quality in a programmer is knowing how to enjoy the job without taking issues for granted. Dave Galligher, product development manager at accounting software maker Cougar Mountain Software, says his programmers must do their jobs well, or real people will suffer.

"We take our job very seriously," he says. "Because we write accounting software, people are running their businesses based on information they get out of our program. People order hundreds of thousands of dollars worth of inventory; they take our balance sheets and go to the bank for loans; they're filing their taxes based on information based on our system. It's very serious."

Galligher says good programmers also need good writing skills and the ability to think on their feet. One of the things a programmer does is "spec" all

the products; a product specification can be more than 400 pages. As for quick thinking he says, "I can tell if a programmer is good if they can write all the code in their head and the coding process is just getting it out of their head and into the computer."

A person who enjoys puzzles is another good candidate. That's because a big part of many programmers' jobs is deciphering legacy code. That's the code that makes up an existing program, which can extend to millions of lines in even a simple application. Before anyone can make improvements to a program, they must understand how it works. That can be tough, especially if you run across problem like those mentioned earlier, where people took little care to create programs others would understand later. Even in a best-case scenario, however, there's some detective work involved. That's because all programmers have their own style, and no two programmers create the exact same program because they start with different emphases and assumptions.

There's just no way around legacy code, Galligher says, so you have to find people who can figure it out, and then improve it. "Whenever you've had a product that's been

around for X number of years, sometimes when you have a different group of people work on the software product over the years, you come up with better ways to do things, to make it faster, use less memory, and accomplish more."

Harris, who's also known a few programmers over the years, says it definitely takes a certain type of person to be a good programmer. The problem is nobody is able to define that "type" of person. "Interestingly enough, over the years nobody has been able to identify that trait," he says. "They've given all sorts of tests, and nobody can say if you score high enough on a certain test you'll be a good programmer and vice versa. It certainly takes some brains, but it's not IQ. I sure don't know what it is."

■ Education: Real World & Academic. While it takes a certain indefinable something to make someone a good programmer, having the knack isn't enough to get most people a job. In addition, most employers expect some education and, most importantly, experience. "In the programming industry you'll find many people are self-taught," Galligher says. "Programming is an art form that requires creativity, and you have to be willing to look at an individual and not be tied to that person's academic credentials."

You can't always blame a programmer, especially one right out of school, for their shortcomings, he says. "Sometimes . . . you find schools teaching people four or five different languages, and they don't spend the proper amount of time understanding the nuances of each language. What happens is you end up with people who are exposed to many languages, but it's not applicable to anything in the real world."

Harris also says limiting factors in higher education are a big reason so many programmers must learn on their own, or on the job. "While people may have graduated with a degree in programming, they learn BASIC (a programming language) and other things that are rarely used in the industry because colleges are not vocationally oriented. So when they do get a job, they have to learn

IT Careers By The Numbers

The statistics show that a shortage of workers makes the information technology field a worker's market.

- *Salaries for IT professionals rose an average of 10% in the last year. (Computerworld)*
- *Over the next 10 years, an additional 2 million workers will be needed to fill IT jobs. (Bureau of Labor Statistics)*
- *One-fifth of college alumni who began their careers as computer professionals were still in the industry after 20 years, according to a 1993 survey. (Boston Globe)*
- *In the United States alone, around 500,000 persons will be needed to deal with the Year 2000 bug. (Newsbytes)*
- *Between 1996 and 2006, technical schools will produce an estimated total of 350,000 IT-trained graduates. (Electronic Engineering Times)*

COBOL or something, and that's self instruction."

Dr. Richard Skinner, president of Clayton College & State University in Morrow, Ga., home of an unusual Information Technology program, says his program is one of the first to address the problem of colleges teaching subjects other than what the industry needs. "What the industry needs and what we in higher education were producing wasn't bad; it was just in misalignment," Skinner says. "The industry was looking for somebody who could come in and begin to develop applications immediately. Most of the computer science programs were there for people to do research and development."

Creating educational programs that teach the skills students need in the rapidly evolving world of computers and programming has proven to be a tough chore, and it requires a lifelong commitment from the folks who want to continue in the profession, he says. "It's not just a case of preparing people, but finding a way to sustain them professionally in a field where shelf life of knowledge is like bread. It means you become a perpetual student or you don't work."

While continued education is important, Galligher says once good programmers establish themselves, and know the job, they should be able to adapt to new languages along the way. "It isn't necessary for them to understand the language we work in, but they should have some coding experience," Galligher says. "I've found that people who understand how to program in one language can pick up another. It's just the syntax (that changes among languages)."

The Y2K Gold Rush. As educators and industry work to figure out a better plan, a small complication has sprung up in the last few years called the Year 2000 (Y2K) bug. Heavy media coverage of the Y2K bug has helped fuel a feeding frenzy for programmers skilled in older programming languages such as COBOL that are necessary to help companies correct the problem. The problem lies in older programs that use two-digit fields for dates, assuming "19" for the first two digits. Thus, when '99 becomes '00, many computers will think it's 1900 all over again. (See "Countdown To 2000" in this issue for more on the Y2K bug.)

Harris says that preparing most companies' systems for 2000 involves searching the system codes for date fields. The problem is, date fields are very common in most programs, and it

requires a great deal of time and concentration to find and fix every single one in a program.

"It's created such a demand that the price in the last 18 months—and this is recorded in the journals—for contract programmers has been increasing in value at 5% per month," Harris says. "To hire a COBOL programmer who can help you with the change, you're paying top dollar." That top dollar can be anywhere from \$75 to \$100 an hour, he says. When you're talking about upwards of two thousand hours in a year, that's a lot of money.

"I tell people who are graduating from high school if they want a job to get themselves two or three months of training in COBOL, and their first job will pay them more than their father is making as an accountant at the same company," Harris says.

However, Skinner cautions programmers, and wanna-be programmers, that while it's a prosperous time right now, specializing in Y2K fixes is an unwise long-term career goal. "We're going to see a lot of people jump into this field thinking it is a meal ticket. I keep reminding people that in a short amount of time you're either going to fix the problem or buy something to replace it. Once that problem is gone all those people who think they have a gravy train are suddenly going to find themselves not in the catbird seat."

Galligher raises similar concerns and cautions people to think about their futures, instead of just making a grab for the money. "There's always money to be made," he says. "But after the Year 2000 what are these people going to do? If they're just working in COBOL how many jobs are there going to be, and how many companies are going to continue to support these old systems?"

The Future Of Programming. Looking beyond the Y2K situation, and farther down the line, at least one expert expects

changes in the way programmers operate, and in the type of people who will find their way into the field.

"We may see some significant breakthroughs in the nature of applications that could at least reduce the level of sophistication of some programs," Skinner says. "Right now you have to know quite a bit to be a programmer, but I'm not sure that's going to hold up." He says he sees the tools used to create applications becoming more standardized and easier to use in the next five years. That means more people will be able to get involved in the process. **Object-oriented programming (OOP)** will play a big part in this. OOP is a type of programming that lets programmers modify pre-existing code rather than constantly writing new code.

"Because of object-oriented programming we're already beginning to see in some areas of programming—especially Web-based development—kids with artistic and design skills becoming interested," he says. "In the past those kids might have been tolerated, but now they're able to do very good things."

**I tell people
who are
graduating
... to get ...
training in
COBOL, and
their first job
will pay them
more than
their father is
making. —**

**Peter Harris,
ADPAC software**



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Canon

Key Printing Terms



"I plugged the doodad into the doohickey and connected the thingamabob, but it was when I touched the widget that the whole whatchamacallit blew to smithereens."

When it comes to technology, the ability to talk the talk is just as important as the ability to walk the walk. That's especially true when you need help. If you can't tell the salesperson or technical support technician exactly what you need or what's going wrong, you'll end up playing a game of 20 questions trying to figure out the problem. Knowing the correct terminology is a vital part of being a productive printer user.

cartridge

A removable module that contains ink or toner.

The cartridge, whether containing ink or toner (powdery substance used instead of ink in laser printers), must be replaced regularly throughout the life of all printers. Follow directions carefully when replacing the cartridge. Depending on brand and type, some empty cartridges may be sold to printer manufacturers or sent to cartridge recycling centers.

dots per inch (dpi)

A measure of printer resolution that indicates how many dots a printer can place in one linear inch.

At the most basic level, printer-generated images are little more than a collection of deliberately positioned dots on a piece of paper. The resolution of an image is determined by how many of these dots fit into a linear inch. A printer that can put lots of dots in a linear inch

offers better resolution than a printer that puts just a few dots in a linear inch.

For example, a printer that prints at 600dpi will produce an image that is more crisp than a printer that prints at 300dpi.

draft mode

A low-resolution printer setting that lets a printer print as fast as possible.

Because printer supplies aren't cheap—a toner cartridge for a laser printer starts at approximately \$35 and an ink cartridge for an inkjet printer starts at approximately \$20—many users choose to print rough drafts, personal copies of important documents, and non-business documents in draft mode to preserve toner and ink. Draft mode also may be referred to as Econo-mode.

inkjet printer

A printer that forms characters and images on a page by spraying tiny drops of quick-drying ink onto the page.

Although various methods of inkjet technology are in use today, the principles behind the technologies are the same. Essentially, the print head is heated and a minuscule drop of ink is forced through the nozzle onto the paper, creating the image.

laser printer

A printer that uses laser technology to print images on paper.

When a laser printer is ready to print a document, it uses lasers to create a mirror image of the document on the drum. The rotating drum, which is coated with a light-sensitive compound, becomes electrically charged when exposed to the laser. As the drum passes the toner cartridge, the toner attaches to the areas on the drum that carry the electric charge.

The paper slides into the printer and becomes charged with static electricity as it passes the corona wire. When the paper passes the drum, its static electricity attracts the toner from the drum, thereby pulling the image to itself. Finally, the paper passes through the fusing system (also called a fuser), which melts the toner to the paper. The paper emerges from the printer, literally hot off the press.

memory

An area that holds the data that has been sent to the printer to be printed.

Every printer sold today has a small amount of built-in memory. A typical printer has between 64 kilobytes (KB) and 4 megabytes (MB) of memory, but some hold 50MB or more. A printer needs approximately 1MB of memory to print a full-page image at a resolution of 300dpi. It may need 8MB or more of memory to print a full-page graphic at a resolution of 600dpi. Sending a file too large for the printer's memory can slow printing.

Users who plan to print lots of detailed images need printers with lots of built-in memory, or they should add memory to their current printers (see this issue's Upgrading section).

orientation

The direction in which an image or text is printed on a page.

Most printers have two orientation settings, portrait mode and landscape mode. **Portrait**

mode is the default orientation setting and prints images that are taller than they are wide. Word processing documents are almost always printed in portrait mode. **Landscape mode** is used infrequently. Fliers, graphics of unusual size or shape, and spreadsheets are examples of items that are sometimes printed in landscape mode.

pages per minute (ppm)

The number of pages a printer can print in one minute.

Printers aren't the fastest computer peripherals you'll ever use. The document that your computer can access in milliseconds may take minutes to print. In general, laser printers are faster than inkjet printers, and black and white printers are faster than color printers. This can be an important factor to consider when shopping for a printer.

paper source

The method or device used to insert paper into a printer.

Most laser and inkjet printers support two paper sources: manual feed and input trays or bins. Some business-class printers also support cassettes.

Manual feed requires users to insert paper into the printer when it is ready to print a document. It's used primarily for printing documents or images on paper of unusual size, such as envelopes or labels.

Input trays (shelves or compartments located outside the printer) and bins (compartments located within the printer) hold a quantity of paper, anywhere from 25 pages to 200 or more pages. Tiny rollers automatically pull the paper into the printer one page at a time. This is the default paper source for most home- and business-class printers.

Cassettes, which are most common on business printers, typically hold more pages than a tray or bin. Cassettes make it possible for printers to fulfill large print jobs or to print lots of small print jobs without running out of paper. Cassettes come in various sizes, making it possible for printers to print large quantities of nonstandard-sized documents.

photo-quality

A measure of printer quality that implies a printer can produce images that match the quality of color photographs.

The key technology behind photo-quality (also called photorealistic) printers is the continuous tone printing process. This process, which can involve changing the shade or color of the dots that constitute an image, minimizes the grainy effects of printer output, giving color images an appearance that nearly matches the quality of developed photographs.

Dye sublimation, contone, and some laser printers claim to offer photo-quality printing. These printers tend to be expensive and typically are used only by businesses that offer specialized printing services. The quality of photo-quality also varies, generally corresponding to the price of the printer.

printer buffer

A temporary storage area in the printer that holds the data waiting to be printed.

When you activate a print job, the computer processes the data and sends it to the printer. But a printer cannot process data as quickly as a computer. So the printer uses its printer buffer (also called a print buffer), which is part of the printer's memory, to hold the print job until the printer is ready to print it. The printer then retrieves the data from the printer buffer on a first-come, first-served basis.

The printer buffer maximizes productivity by removing the print job from the computer. This effectively frees up the computer's memory so the user can resume using the computer for other purposes. The printer buffer also lets the printer process print jobs at a pace it can handle.

print head

The part of the printer that transfers ink to the paper.

In an inkjet printer, the ink cartridge connects to the print head, where the ink is heated and dispensed onto the page. There are various implementations of this system. Some inkjet printers integrate the ink cartridge and print head components, while others separate the ink cartridges from the print heads. Because of these differences, it's important to purchase replacement cartridges that are designed specifically for your printer.

print spooler

Software that manages the data that has been sent to the printer.

Unlike the printer buffer, which simply holds a print job until it is printed, the print spooler actually manages the print jobs as they wait to be printed. Most operating systems, including Windows 95 and Windows NT 4.0, and many applications include built-in print spoolers. You don't need a print spooler to use a printer, and print spoolers are most common in multiuser environments.

The print spooler controls a print job from the minute it's activated. It transfers the print job to the printer buffer, keeps it in order or lets the user rearrange the order of the jobs waiting to be printed, and maintains communication with the printer so the print jobs can be printed as quickly as possible. See *queue* for related information.

queue

The order in which data is waiting to be printed.

A printer queue is like a line of people waiting to get onto a bus. A print job takes its place at the back of the queue and waits in line until the printer is ready for it. A print spooler can be used to rearrange the order of the print jobs or to cancel a print job. Queues are most common in multiuser environments.

resolution

The clarity and sharpness of an image.

Resolution, measured in terms of dots per inch (dpi), is the most important determinant of printer quality. It's why users prefer laser printers (typical resolution: 600dpi) over inkjet printers (typical resolution: 300dpi).

Sometimes, resolution is measured in terms of horizontal by vertical dpi, such as 600dpi x 600dpi or 720dpi x 360dpi.

toner

A dry powdery pigment used by laser printers and copy machines to form images on paper.

Unlike inkjet printers, laser printers don't use wet ink to create an image on paper. Toner, the laser printer's media of imprintation, is fused to paper with heat. Toner cartridges tend to cost about twice as much as inkjet cartridges, but they can print more pages. ■

by Jeff Dodd

All About Paper

Paper is paper, right? That promotional letter you're sending out to prospective clients will look just fine on a 20-pound vellum, won't it? After all, you're never again going to let an unscrupulous clerk at a paper store talk you out of \$96 for a ream of 32-pound cockled paper that jammed and tore in your printer. Maybe you're a paper pro. You know how to access the weight, texture, and finish of a sheet of paper at a glance, right?

The truth is somewhere in the middle. Most of us know what we don't like after we've torn the ream open and can no longer return the paper. With offices and homes turning into mini-print shops, it's a good idea to know the facts about paper—from how it's made to how to pick the best kind.

Makin' Paper. Once the trees are chopped down and shipped to a mill, they are stripped of their bark and chopped into progressively smaller pieces. The tiny pieces are mixed with chemicals and pressure cooked into a mushy mass called pulp. The pulp is cleaned and bleached until it has the consistency of slush. The slush is put in fast-moving, wire mesh screens where it eventually sets into a continuous sheet of paper. As the slush moves down the line, excess water is squeezed out, and the not-so-slushy sheet becomes a web. The web runs through rollers that not only remove water but also ensure uniform thickness.

The web is then forced through heated rollers that remove the remainder of the water, and the continuous sheet is wound onto giant spools called parent rolls. Then, the rolls are cut at the mill or shipped to paper companies where they are cut and packaged. At this point, regardless of the size, texture, weight, or color, the paper is called stock.

(NOTE: For an excellent tutorial of the paper-making process and additional pages with interesting paper facts, visit the Mead Corp. World Wide Web site at <http://www.mead.com>.)

Paper Terms. The many variations of paper making result in different weights, degrees of brightness, finishes, textures, colors, and sizes. Rollers, set to varying widths, determine how thick or thin a sheet will be. The thickness or caliper of the paper determines its **weight**; the higher the weight, the better the quality of paper. When a pound weight is assigned to paper, that refers to the weight of 1,000 sheets of that particular stock. Twenty-pound is the most common weight for copy paper, and 24-pound is the most common for general office printing. Business letterhead is usually a 28- or 32-pound stock.

Brightness refers to how much light reflects off a sheet; the higher the rating, the better the paper's quality. The brighter the sheet, the sharper the contrast to the print or illustration, and the easier the document is to read. Titanium dioxide and magnesium oxide are two of the more prevalent chemicals added to pulp to increase the brightness. Average brightness for a white sheet of paper is 82, while a blue-white sheet, with excellent contrast and brilliance, will have a brightness rating of 92 or 94. Just as you'll see the weight on the label of the ream or carton of paper, many companies now include a brightness rating on their packages.

Finish refers to the surface of the paper. Printers and paper manufacturers refer to cheaper, bumpier surfaces as **toothy**. Lacking a smooth, hard surface, these papers are usually porous and will absorb rather than set the ink of an inkjet printer, causing the image to spread or bleed. When you print a document, the surface appears fuzzy, smeared, and difficult to read. **Vellum**, the roughest paper, is an example of a toothy paper. To obtain a harder finish, manufacturers roll paper over drums and spray it with a clay coating. This finish is what paper makers refer to as **coated paper**. **Calendering** is another way to attain a smooth, shiny finish. Uncoated paper is run over additional drums where it is polished by steel rollers. **Calendered** paper is rated from roughest to smoothest: vellum, antique, wove, and smooth.

Textured papers are those with raised or uneven surfaces. Examples include laid, linen, ribbed, embossed, and cockled paper. Textured paper gives a document a richer, more polished appearance, but the rollers on home and office copy machines and printers get caught on the uneven surface causing the paper to tear or jam. Today, many textured papers are compressed or coated so they can be used in office copiers and printers.



Grain is the term for the lay of the paper. As the slush travels along the wire meshes, the tiny particles align themselves with the direction of the flow. Once the paper sets and dries, the aligned particles form the grain of the paper. Paper is generally cut with the grain and is referred to as grain long. A ream or carton of 8.5-by-11 inch paper is usually grain long. A parent sheet (23-by-35 inch) may be cut grain short (against the grain) if special orders stipulate pages in sizes other than 8.5-by-11 inch.

■ Using Paper.

Sue Virant, a customer service representative for Omaha Paper Co., says all printer and copy machine manufacturers specify paper standards: weights and types of paper for optimum machine performance. Additionally, paper manufacturers print guidelines for use on their labels. Virant advises that if you're uncertain whether a specific weight or texture will run in your printer, read the label on the paper and see what the manufacturer recommends.

Using a different grade or weight probably won't break the printer or copier, but the quality of the job may suffer. For instance, if 60-pound paper is your printer's utmost limit and you try to print on 80-pound cover stock, your machine may not run the paper through, it may damage the stock, or the ink or toner may smudge or flake. Rollers in copiers and printers are set to certain widths, and they grab and pull the stock, guiding it through the machine. If the paper is too light, less than the 16-pound limit, for instance, the rollers may fail to grab the sheet or pull several sheets through at once. Eventually it will jam because the rollers can't keep moving the lightweight paper along.

INKJET printers usually need a harder, non-absorbent, coated surface that will dry quickly. Since inkjets spray the ink onto the paper, a porous page allows the ink to spread out over the page. Again, look for manufacturers that guarantee their paper for use with inkjet printers. Virant says many of the premium papers, such as cockled (paper composed of 25% cotton fibers for a richer look and feel), are coated so they can be used in inkjet and laser printers. In the past, papers with textured surfaces would hang up on the rollers and either tear or jam. The prevalence of home printers has created a greater demand for premium

Check out Mead Corp.'s World Wide Web site for an online, paper-making tutorial and interesting paper facts.

paper, and manufacturers have responded by coating and polishing paper surfaces.

Laser printers are slightly more tolerant than inkjet printers of different surfaces since the toner doesn't bleed into the page. For best results, though, you'll still want to use a smooth, hard surface so the toner doesn't chip and flake as it can on uneven surfaces.

While copy machines tolerate a wide range of weights, they are intolerant of most textured paper. Laid, linen, or patterned paper may go through the copier, but the toner will probably spot and flake. Virant says copy machines are also finicky about the grain. Rollers pull paper through the copier, and over time the rollers develop a fit for sheets with a specific lay. When you mix up the grains, the rollers don't grab the paper the same way and will often jam.

■ Paper Storage. Other problems you can run into are heat and humidity. Humidity lets paper stretch, which causes it to wrinkle, tear, fold, and jam when pulled into your copier or printer. Have you ever seen an uneven crease through the paper after printing or copying? That's the result of stretched paper.

Dave Abernathy, owner of Printability Business Printing in Geneva, Ill., says moisture will adversely affect the receptivity of paper to toner and ink. Text and images may smudge and flake, or the toner or ink may not transfer to the damp paper at all. Abernathy cautions that sudden temperature changes also cause physical paper deformation including curling, stretching, shrinking, and dimpling. He suggests that if you are moving stock from a bitterly cold or blistering hot storage area, let it adjust to the new environment for a couple of days before unwrapping it.

Abernathy maintains that packing and storage are the most important factors in preserving paper. He recommends storing paper in a cool and dry area with the wrapping secured and in boxes with the lids. After opening a ream of paper, if he doesn't use all the paper, Abernathy says he shrink-wraps the remaining paper to keep dust and moisture out and prevent the edges of the paper from curling.

Although dust isn't as much of a threat to paper as heat and humidity, it will gunk up your copier or printer, requiring more frequent cleaning. For professional printers working with liquid ink, dust will alter the color and can prevent the image from adhering to the paper.

■ Buying Paper. Formerly, consumers purchasing paper in small quantities could buy it only at a premium price through local print shops. With both leisure and office computing taking place in the home, there has been an increased demand for more affordable and more readily available paper of all weights, cuts, colors, and textures. Joyce Owens, customer service representative for Champion Paper in Hamilton, Ohio, says to stay competitive, mills now have to make all grades of paper available to a much wider consumer base. If you're pressed for time and need to grab a few groceries and a few reams of paper, Champion can help consolidate your trips because they now sell paper directly to Kruger's—a grocery store! In addition to the more prevalent 20- and 24-pound paper you're likely to find at grocery and discount stores, you can also purchase sheets, reams, and cartons of virtually every grade of paper at office supply stores such as Office Depot, Office Max, Quill, and Staples. Most office supply stores also offer online shopping, so you can order the paper from the comfort of your home or office.

You can find the cheapest to the most expensive types of paper at specialty print stores, office supply stores, and, in some cases, grocery stores. Before you buy, it's a good idea to double-check your instruction manual for your printer and find out the recommended weight and finish for your model. After making your purchase, be careful where and how you store the paper so as not to damage it.

by Katie Powers

Speak Up!

Make Your Microphone Work For You

Microphones are the ugly ducklings of desktop computer systems' components. Many people don't know quite what to make of them, let alone what to do with them. Even if you have taken your microphone out of the box and actually unwrapped it, it's probably still unused and doing nothing more than taking up desk space.

It pays to explore some uses for PC microphones as they become increasingly common components in PC systems. Gateway, for example, includes microphones with most of the personal computers it sells as part of a fax/modem package. If you're one of the unlucky ones who didn't receive a microphone with your computer or if you need one of those special headset microphones for dictation, you can purchase one relatively cheaply from mail-order companies or retail stores such as Best Buy. A microphone could cost from \$8 to \$50, depending on its type and quality.

So now you probably want to know what you can do with it. Practical ideas include:

- using the microphone in place of your mouse and keyboard
- turning your computer into a speakerphone
- sending sound files to your friends.

Hello, Computer. Voice recognition software still isn't perfect, but it's the most promising and fascinating use of the microphone. This tool lets a computer recognize spoken commands and act on them as if they were keyboard or mouse commands. Some sound cards come with voice-recognition software. Check your sound card documentation to see whether you are one of the lucky ones.



Don't fret if you don't have voice recognition software. With prices dropping and reliability increasing, it's a great time to buy. The "Voice Recognition Advances" article in the August issue of *Smart Computing* featured four voice recognition software packages—three of the four were available for less than \$160.

Reach Out & Touch Someone. Many computers now come with a modem and software that lets you use your computer as a speakerphone. You'll obviously need a microphone for the person on the other end of the line to hear you. Most computers and modems that support speakerphone capabilities come bundled with a microphone. If you decide to use your computer to reach out and touch someone, be sure to keep the microphone away from the speakers and be sure not

to turn the speakers up too loud. Otherwise, the person you're calling will receive an earful of screeching feedback.

You also can take the computer as a telephone concept one step further. Many PC speakerphone software packages also let you use your computer as an answering machine. If you're willing to leave your computer on 24

hours a day, seven days a week, you can use voice-mail software that will have the computer pick up incoming calls and take messages just like an answering machine. You'll need that mike to record your greeting. Many voice mail programs also let you have more than one voice-mail mailbox. Everyone in the office or family could have a mailbox with their own greetings.

Of course, microphones are not only handy for telephone calls; they're also useful for any kind of network conferencing. Several software packages, such as *FreeTel* and *Microsoft NetMeeting*, lets users hold audio- or videoconferences over the Internet. But without a microphone, you'll be limited to a game of charades in a videoconference.

■ Spice Up That E-mail.

Now that E-mail messages support attachments of about any multimedia file, it's easy to send audio greetings to your friends. For example, you can create your own audio messages using Windows 95's Sound Recorder. To launch it, go to the Start menu, Programs, Accessories, Multimedia, and the Sound Recorder.

To record a new sound, press the record button (the one with the red dot). Speak into the microphone and press the stop (black rectangle) button to finish. Then select the Save command in the File menu to save the file. Once you save the file, you can attach it to any E-mail message (as long as your E-mail programs allows you to attach files).

These ideas are only a few of the possible uses for the microphone. Whatever you choose to do, your microphone shouldn't have to merely collect dust. ■

by John Lalonde

*How do
we love thee?*



Sandra Bailey, welcome to AAdvantage Gold.
Some very special benefits await you.

AA.com™. It's all new. And now, it's all yours. Whether it's instant access to your AAdvantage® account, a travel package inspired by your unique interests or reaching a milestone in your membership – AA.com takes you to the next level. Even our new, faster travel reservations tool was designed to save you time. Save money, too, you say? American's exclusive Net SAAver Specials® are a great way to get away on a budget. So visit the new AA.com today. Built around you, there's truly no other site quite like it.

The ultimate web site for everything **AmericanAirlines**

Build A Web Site, Part 3

How To Publicize Your Pages



Welcome to the last installment of our three-part series on building a working World Wide Web site. If you've followed along from the beginning, you've created a Web version of your résumé and uploaded it to the Web. But no matter how good your résumé looks, it's not truly working on the Web until potential employers can access it.

The problem is getting the 44 million people currently using the Internet to find you among the stiff competition of more than 300 million pages available. It's a challenge beginning Web authors often fail to consider, though it's a critical part of Web development. This month we'll provide the solutions, showing you various ways to promote your résumé—or any Web page—using the Internet itself. We'll explain searching on the Web, walk you through

the page registration process at several search sites, and point you to some Web-handy promotion services.

To participate in the tutorial, you need only an Internet connection, a browser such as *Netscape Navigator* or *Microsoft Internet Explorer*, and the Universal Resource Locator (URL, Web address) of your résumé Web page.

■ Searching The Web. Let's begin with an overview of the Internet's essential locator tools. To locate a Web page, or any kind of information on the Web, we use search engines, powerful services that compile and sort through huge databases of information about the Web. You can access search engines as you would any Web page, by typing their addresses into your browser. Search at the site by entering queries, or descriptive words or phrases. In response to a query, an engine

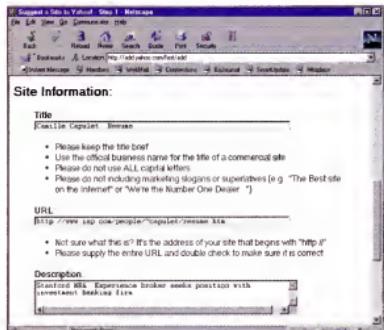
reports back matches, or hits, which appear as a list of Web pages. Popular search engines include *Yahoo!* (<http://www.yahoo.com>), *Altavista* (<http://www.altavista.com>), and *Excite* (<http://www.excite.com>).

For simplicity's sake, we include *Yahoo!* in the general category of search engines, but more specifically it falls under the heading of *Web directory* or *Web catalog*. These types of services pay employees to find and present data in organized, browsable categories. Directory searches are selective, not exhaustive. The more comprehensive, "plain vanilla" search engines like *Altavista*, on the other hand, collect Web data compulsively and thoroughly through automated searches. Therefore they supply more copious returns to a query, which requires more processing on the part of the user. In truth, no search engine is perfect. That's why experienced surfers typically use

several—and why you should advertise your résumé in several.

One way search engines build their collection of Web sites is by sending out special robot software programs. Typically, these automated programs traverse the Internet in the wee hours of the morning, gather up addresses of Web pages and their keywords (descriptor terms), and return with their booty to the parent search engine, where the data is indexed and cataloged. These programs are also called robots, spiders, Web crawlers, and worms.

Usually, a Web author can't tell if a robot has visited his site. But the good news is you don't have to idly wait, hoping that one stops by your page. It's possible to secure a listing in a search engine's database by formally submitting the page's Web address.



Adding your résumé to the Yahoo! directory is a fill-in-the-blank operation. After selecting the appropriate category, click Suggest A Site and fill out the form.

■ Listing Pages With Yahoo! Submitting a Web site to a search engine is a simple, automated procedure. For a good example, let's visit Yahoo!, the most popular directory on the Web.

When you arrive at Yahoo! you see its top-level categories (and refreshingly, no flashing advertisements). To add your URL, first locate the category that describes your Web page best. For résumés, it's easy. Under Society & Culture, click People. Under People, click Resumes@. Next, select one of Yahoo!'s job categories. Under each category, résumés are listed by name in alphabetical order. Some include a short description.

Choose carefully. If you are a stereo salesperson, for example, you'll want to examine

the résumés already listed under Audio/Video, Sales and Marketing, and maybe under Electronics. Where do you fit? From last month you may recall the sample résumé we created for Camille Capulet. For her, an MBA seeking a job with a brokerage house, we picked Yahoo!'s Financial Services category. If you don't find a perfect fit, choose one that's close. Yahoo! will let you suggest a new category later in the process.

When you settle on a category, scroll to the bottom of the page and click Suggest A Site. (For future reference, notice at the top of the page a "change form" link that lets you make changes to your Yahoo! listing.) Read the instructions, then click the button labeled Proceed To Step One. (Note that these instructions for suggesting a site to Yahoo! apply to all categories, not just résumés.) Yahoo! shows you the hierarchical listing of the category you chose. If you're happy with your choice, scroll down and fill in your site information.

Title. Type in the words you used in your résumé's TITLE tag when you created the page, something like Camille Capulet, Résumé.

URL. Type in your full URL here. To eliminate typing errors, we recommend the copy-and-paste method. Open your résumé Web page. Place your cursor in the browser's Location field and highlight the full URL. Open the Edit menu and select Copy.

Return to Yahoo!, place your cursor in the URL field, delete the default text, then open the Edit menu and select Paste. Your URL should appear.

Description. In this field, type in a short abstract. These are the words that will appear beside your name in Yahoo!'s list. Use as many descriptive terms, or keywords, as possible. Check the résumés already listed for good examples. For Miss Capulet, we say, "Stanford MBA. Experienced broker seeks position with investment banking firm."

Next, click Proceed To Step Two. Here you have the option of suggesting another, secondary category for your résumé, or of suggesting a whole new category that would better suit your page. To continue, click Proceed To Step Three.

Contact Information. Type in your name and E-mail address. Yahoo! reassuringly

promises not to divulge your information to others.

Geographical Location of the Site. If your work is linked to a specific region of the country (say you're a fisher from Puget Sound), you may wish to fill out this optional set of fields. Finally, click Proceed To Step Four.

Here Yahoo! requests information about time-sensitive Web sites. If properly updated, a résumé is not time-sensitive, so leave those fields blank. Under Final Comments, however, you may wish to add important facts about your Web résumé, for example if it exists in more than one language.

Finally, click the Submit button. Now a real live person, a "Yahoo! Surfer," will visit your Web page. If the "yahos" at Yahoo! approve it, your résumé will be added to the database. It may take up to a month. Check back often under the category you selected to see whether your page has been posted.

As you can see, the procedure is elementary. But there are hundreds of search engines on the Web, each with its own set of forms for submitting pages. Listing your page with each one like this would be a monumental task.

■ Submission Services.

Fortunately it's easier than that. The most efficient way to submit to several search engines quickly is to use a submission service. Typically, these are Web marketing companies that offer a scaled-down version of their service for free. We like one called Submit It! (<http://www.submitit.com>). The free version will list your URL in 20 search engines including InfoSeek (<http://www.infoseek.com>), WebCrawler (<http://www.webcrawler.com>), and AltaVista. Here's how Submit It! works.

At the Submit It! home page, click SiteOwner.com, then click the link labeled, Submit It! Free Classic. As you did with Yahoo!, you'll enter a brief description of the Web site, its URL, a set of keywords, the name of your site, and your personal contact information. This is the data all 20 databases will receive. Be circumspect about including personal information in Web submission forms. Expect this data to be made public, perhaps even sold to mailing lists. It may be necessary to include your E-mail address, but unless you're promoting a business, we suggest leaving out your home address and phone number. When you finish entering information, click the button labeled OK, Move On To The Submitting Area.

Next, scroll down the list of search engine sites. One by one, press Submit It! buttons to

register your site. You must make a physical connection to each individual search engine, so be patient on a slow Internet traffic day. Some sites may request additional information. Once an engine has "swallowed" your data, you'll receive a brief confirmation screen. Click the Back button to return to Submit-It!. Once your information has been successfully processed by a search engine, you'll probably receive an E-mail message confirming your listing. It may be several days or even several weeks before your URL appears in a search engine database.

Here's just one terrific benefit of submitting your site: After registering your page on a search engine, you become a regular destination for the resident Web robot. This means, for example, that other pages at your site will be listed and that any updates you make will be recorded automatically.

Although it's handy to use a submission service, it still may take an hour or so to submit to

all 20 search engines at Submit-It, especially if you're composing keywords and descriptions while registering your page. To minimize time spent ruminating online, prepare your Web announcement in advance. Use your word processor to assemble the following:

- List the site title and URL.
- Compose two keyword lists that apply to your site, one short (10 words) and one long (50 words).
- Write up a short description (25 words) and a longer description (60 words).
- List the top five categories your Web site fits into (such as business, health, education).
- List the top five demographic groups for your site (such as children or educators).

Announcement Services. If you don't have time to learn all the angles of Web advertising, you can hire an announcement service to do it for you. You still may have to

fill out an electronic form, but the announcement service will do the rest. Prices vary with the number of URLs you want to submit, the number of search engines you choose, and the sophistication of the announcement service.

For instance, Announce-A-Site (<http://www.webplaces.com/announce>) charges a mere \$20 for adding your page to 15 search engines. A real person, not automated software, handles the submissions. This human approach gives you someone to talk to and ensures an intelligent being will be there to make decisions during submissions and make sure each submission is successful. The Central Registry (<http://www.CentralRegistry.com>), on the other hand, charges \$249 to announce your site at 610 search engines. For more features, try AceBasic (<http://secure.r166.com/swestart/acebasic.html>). This company not only generates summaries and keywords for your page, it provides you with Hypertext

Mega-Searchability With META Tags

Submitting your site to search engines is great, but don't stop there. Even novice World Wide Web authors can use HTML META tags to optimize a site's searchability. Use these tags to deposit hidden keywords and a short description into a Web page.

Generally speaking, software robots index the entire text of a Web page; the first 250 characters or so may be displayed as an "abstract" by the search engine. But by including carefully chosen keywords in META tags, you can focus a search engine on the primary purpose of your page. META tags also let you write your own abstract.

Place META tags within a document's HEAD tags (see the previous articles in this series for details on HTML coding). The HTML syntax is as follows:

```
<HEAD>
<TITLE>Auto Repair for the Home
Mechanic</TITLE>

<META name="description" content="Auto body and engine refurbishment
for classic car buffs and home-based
automotive mechanics.">
```

```
<META name="keywords" content="car
repair, refurbish, engine, classic cars,
automobiles, autos, grease monkey, 57
Chevy, Ford, restore, restoration, auto
body work, bondo, Corvair, Corvette,
rebuilt">
</HEAD>
```

The words appearing in the "description" tag become the official summary of your Web page and often will appear after the page title in a search engine listing. Again, the content of the META tags should clearly convey what one can expect to find at your site. The words appearing in the "keywords" tag are words you expect your audience will use in their queries at a search engine. Remember these META tag pointers:

- You can include up to 1,000 characters in the keyword META tag.
- Include acronyms and the words they stand for.
- If one of your keywords is frequently misspelled, include the misspelling.
- Maximize the usefulness of META keywords by employing word variations. For example, "autos," "automobile," and

"automotive" will yield similar but somewhat varying results. Use as many permutations of a keyword as you can.

• It's a bad idea to repeat keywords. Search engine companies deplore this practice because it ruins the integrity of their database. The Excite search engine, for instance, doesn't support META tags for precisely this reason. InfoSeek is one search engine that penalizes this practice, which could mean having your site dropped from the search engine.

Read up on META tags at these sites:

The WDVL:

META Tagging for Search Engines

<http://www.stars.com/Search/Meta-Tag.html>

The Web Developer's Virtual Library explains how search engines work with META tags and provides many examples and links.

Northern Webs Search Engine Tutorial
<http://www.northernwebs.com/set>

More tips for optimum search engine retrieval. Try the free *Meta Medic* software for fine-tuning META tags. □



An announcement service such as Central Registry will submit your site to more than 600 search engines (for a price).

Markup Language (HTML, the Web's programming language) code to make your page more searchable. The one-time fee for AceBasic service is \$79.95 for submitting your site (by a real person) to 24 search engines.

Announce To Newsgroups. Usenet newsgroups are another place to get the word out. These are informal, topic-specific, electronic bulletin boards where group members post messages for each other. There are about 20,000 Internet newsgroups covering topics from Alsations to Z-particles, making them important places for advertising a related Web site to a specific audience. Newsgroups are accessible through any Internet service provider (ISP), and the newsreader software is built into most browser packages.

To participate in a newsgroup, you first need to subscribe to it. Subscription is free and typically requires sending a E-mail request. (Ask your ISP for help on the technical mechanics of subscribing to newsgroups.) Newsgroup members send posts similar to E-mail messages to an electronic board that all members can access. In this way, hundreds—even thousands—of people converse at once on a favorite subject.

The most important newsgroup for advertising non-commercial Web pages is called comp.infosystems.www.announce. Learn about this newsgroup at its accompanying Web site called, "How comp.infosystems.www.announce Works (FAQ)." Access it with your Web browser at <http://boutell.com/~grant/charter.html>.

No matter which newsgroups you join, first take time to read some messages and learn whether your site will interest its members. You also should read the group's charter; some newsgroups don't accept "advertisements." For example, comp.infosystems.www.announce does not accept announcements from commercial businesses or résumés.

Say you want to announce your home gardening Web site. You might subscribe to hawaii.gardening. Or to rec.gardens.roses. After checking the charter to make sure the group accepts Web page announcements, you might post a message like the following:

Subject:

New Website: Antique Roses of Hawaii

Message:

<URL: <http://www.abc.net/antiques.html>>

Visit the "Antique Roses of Hawaii" site. Photos, garden plans, and links to other antique gardening sites.

If you want to announce your résumé, you might subscribe to misc.jobs.resumes or pa.jobs.wanted (jobs in Pennsylvania). You might post a message like the following:

Subject: Resume: Stanford MBA, broker, financial planner

Message: 1997 graduate, experienced broker and financial planner. Visit my Web site for current vita: <http://www.isp.com/people/~capulet/resume.htm>

Once you delve into newsgroups, you'll wonder why you didn't before.

Selling Yourself. Promoting your résumé on the Internet is an interesting challenge, but there are other surefire ways to make it public.

- Include your résumé URL on every paper résumé you mail in.
- Make personal business cards and include your URL on them.
- Search for résumé listing services on the Web and submit your data to them. (For

example, try Yahoo's Classified section, under Employment.)

- Include your URL at the end of your E-mail messages, like a tag-line.

You get the idea. By taking advantage of search engines and submission services, you get more than a Webified résumé. You get people to surf it and maybe even a new job! ■

by Marti LaChance

Driving In Traffic

If you're serious about increasing traffic at your World Wide Web page, you'll want to visit these excellent sites.

NetPromote's Promotion 101
<http://www.Promotion101.com>

This site provides articles on Web promotion, including reviews of top search engines. You'll also find free promotional tools, such as a Web form that generates META tags.

Internet Link Exchange
<http://www.linkexchange.com>

The Internet Link Exchange is like a Web author's club. Members display small advertising banners for each other. Membership is free.

Rank This
<http://www.rankthis.com>

A slick site that helps you determine your page's ranking in the top 10 search engines. Also offers promotion advice and lively chat group.

Search Engine Watch
<http://www.searchenginewatch.com>

The definitive site for search engine info. Get optimizing tips, Web searching technology and history, engine reviews, and even financial reports on search engine companies.

Scanners' Endless Possibilities

Explore The Capabilities Of These Simple Devices



A scanner is a scanner is a scanner, it's as simple as that. Every scanner, from the lowly handheld scanner to the industrial-strength drum scanner, has one purpose: To convert hard copy documents and images into digital data. By itself, a scanner can't print documents, transmit faxes, send E-mail messages, or make photocopies. It simply scans.

But with the right add-ons, a single-function scanner can provide dozens of functions. When combined with the right software and hardware, a scanner can stand in for numerous office machines, including a fax machine and a photocopier. The scanner may not be the most efficient device for performing these sundry office tasks, but it can do the job.

Software Needs. It takes scanning software (also called imaging software) to make a scanner work the way it should. Basic scanning software bundled with every scanner provides the user interface, contains the image-capturing capabilities that convert a document or image into digital data, and lets the user view and save the image.

Most high-end scanning applications, such as ScanSoft Inc.'s *Page Pro* and Visioneer's *PaperPort Scanner Suite*, offer more than the basics, though. These applications include the ability to fax, print, or send an E-mail message with a scanned image from within the scanning application. They also feature image-editing, text recognition, and rudimentary systems of organizing and managing the scanned data.

To take full advantage of these advanced capabilities, users often need to supplement the scanning application with additional software, such as a faxing application and an electronic messaging application. Many of the latest operating systems, including Windows 95 (Win95), feature built-in fax and E-mail utilities that support most scanning applications.

(NOTE: Some new scanners, such as the Visioneer *PaperPort OneTouch*, sport buttons that let users activate a scan, photocopy, or fax without going through the software interface. Users still need scanning software loaded on their computers, however, to use these one-touch functions. The buttons are simply a new way to do an old thing.)

Hardware Needs. Scanning software gives a scanner the ability to perform many different functions, but it takes a few pieces of hardware to make those functions a reality.

Printer. A printer is the most useful peripheral to accompany a scanner. A printer is necessary if users want to use their scanners to print photocopies and forms. Most users own printers before they purchase a scanner, so this usually isn't an additional expense.

Some users, however, find themselves upgrading their printers after purchasing a scanner. In most cases, the upgrade is from a black-and-white printer to a color printer. Users want to print the color images they create with the scanner, and the shades of gray from a black-and-white printer just won't cut it anymore.

Modem. Users need modems if they plan to take advantage of their scanners' messaging capabilities. Without a modem, a scanner can't fulfill its faxing and electronic messaging capabilities. It doesn't take top-of-the-line 33.6 kilobits per second (Kbps) or 56Kbps modems to use these features. Older fax machines transmit data at 9600 bits per second (bps) or 14.4Kbps, and a modem of a similar gauge won't hamper the ability to transmit text.

Storage. Typical scanned documents consume between 100 kilobytes (KB) and two megabytes (MB) each, while detailed color images may consume more than 30MB of storage space. It's easy to see why some users find they need alternative storage devices, such as an Iomega Zip drive or a SyQuest SparQ drive, after they purchase scanners. These storage devices use removable media, offering a practically endless storage capacity as well as the ability to transport the data from one computer to another.

Memory. A computer that doesn't have enough random-access memory (RAM) will lock up under the weight of a high-resolution scan. If your scanner encounters this problem, get more memory or reset the scanner settings at a lower resolution. A PC should have at least 16MB of memory to support scanning software.

Scanning Possibilities. Once you have the software and the hardware that lets you wring all the benefits from your scanner, it's time to create something. Here, the possibilities are as endless as your imagination.

Image scanning. Getting that Kodak moment from paper print to computer monitor seems to be an accomplishment that few scanner owners can resist. But after the picture is captured on-screen, there inevitably comes a moment when the user asks, "What's next?" As long as a user has the right software, the answers range from building an electronic inventory of household valuables and creating personalized greeting cards to putting product catalogs on the Internet and digitizing a company's employee directory.

Anything that can fit on the scanning surface is fair game for a scan, says Chris Smith, marketing manager at Commax Technologies Inc. That includes three-dimensional (3-D) images as well as the typical two-dimensional (2-D) images and documents. "Most (flatbed scanners) will scan in 3-D," he says. "So try putting a banana or apple on the glass. Your hand should also scan, with freckles and all. A real object on your Web page can look great."

Once you scan an image into the computer, you can use it to create calendars, scrap books, greeting cards, genealogical projects, school and business presentations, World Wide Web sites, T-shirt designs, birth

announcements, and brochures. When coupled with quality image-editing software, such as *MGI PhotoSuite* or *Adobe Photoshop*, scanners give users the opportunity to manipulate pictures in ways that had previously been impossible. Users can alter an image's colors, apply various special effects, remove unwanted elements from a photograph, or add graphics and text to an image.

Photocopies. "We find that users at every level use their scanner like a photocopier to scan things and print them out," says Patti Norris, a senior product line manager at UMAX Technologies Inc. No more searching for dimes or a copy machine when you need to make those last-minute copies. Just scan the document and print it on your printer. It's slower than using a photocopier, but the convenience of making copies at home is well worth the lost minutes.

No more searching for dimes or a copy machine when you need to make those last-minute copies. Just scan the document and print it on your printer.



hired someone to fax documents for you.

Faxing. "Nobody has a typewriter anymore," says Paige Mendenhall, a technical marketing specialist at UMAX Technologies Inc. "How do you get an already existing form in

your system so you can fill it out? A scanner will allow you to do that."

Once upon a time, it was easy enough to roll a form—whether it was a tax form, employment application, or license application—through the typewriter and produce a professional-looking document. But a good typewriter is hard to find in our post-typewriter milieu created by the advent of affordable computer technology, and running a form through a computer printer just doesn't work. Scanners and scanning software have saved the day.

Many imaging applications, including *Presto PageManager* and *Pagis Pro*, sport features that let users scan preprinted forms into a computer, use the keyboard to enter the responses in the correct places on the form, and then output the form through a printer or fax machine. The results are impressive, and people will wonder where you got the typewriter.

Document management. You can employ a scanner as a surrogate photocopier, fax machine, and typewriter, but it's not designed to completely replace these office machines. Individuals and businesses that need to do a lot of photocopying should buy a photocopier; the same goes for fax machines and typewriters. But one function that can't be performed by any other business machine is document management.

Until recently, the primary tool used in the storage and management of documents—including bills, receipts, warranties, newspaper clippings, licenses, customer records, and product catalogs—was a file cabinet. When organized and maintained properly, a file cabinet provides an easy way to find one particular document in a sea of thousands. But this system of organization has its drawbacks. File cabinets are big and bulky, and they aren't the most secure form of data storage. Individuals and businesses rarely make backup copies of the information they keep in a file cabinet. If those documents are lost through theft or a natural disaster, there's usually no way of replacing them.

Their biggest drawback, however, is that file cabinets only allow for one method of data retrieval—alphabetically or chronologically, for instance—and that method only works if you've properly maintained the files. If the documents aren't maintained and organized diligently or if an individual needs to locate information that doesn't comply with the current system of organization—for example, a business wants to locate the receipt for its biggest sale in a file cabinet that's organized

Multifunction Devices vs. Scanners

Multifunction devices, which generally offer scanning, faxing, photocopying, and printing functionality in one piece of equipment, are not direct competitors of standalone scanners. A scanner may be able to affect some of the capabilities of other pieces of office equipment, but it can't print, fax, or photocopy by itself.

The two primary factors to consider before choosing between a multifunction device and a standalone scanner are price and quality. Multifunction devices are more expensive than standalone scanners, but

less expensive than purchasing three or more office machines. Also, the scanning quality of a multifunction device tends to match the performance quality of a low-end or mid-range scanner. Users who need professional-quality scans must purchase a standalone scanner.

Generally, small businesses and home-based businesses that use a scanner, fax machine, photocopier, and printer on an occasional basis or that won't use a printer or scanner to create professional-quality color documents will benefit most from a multifunction device.

Businesses that use scanners, fax machines, photocopiers, and printers on a daily basis or as a means of generating income, however, should purchase separate devices to handle their needs. Businesses can purchase high-end devices for less than \$400 each.

Individuals and small businesses that use an office machine infrequently can get by with a scanner and a printer. With those two devices alone, they'll be able to fax, photocopy, scan, and print. □

chronologically—then retrieving information can be a nightmare, taking hours, days, or weeks to locate a single piece of data.

That's where a scanner comes in handy. When you scan a document, you have both the original document and an electronic copy. Because you have two copies of the document, you can store one on-site and another off-site, ready to fill in when a natural disaster or thief strikes. And if you don't need the original copy, you can recycle it in the trash bin.

Another benefit of electronic document management is that electronic data is much more compact than hard copy documents. You can store a file cabinet full of documents on one 3.5-inch disk from an Iomega Zip drive, for example. You can transport a disk easier than a folder full of documents, and when a disk or cartridge is full, you can replace it with another one, usually for less than \$30.

But the most convenient aspect of electronic document management, says Steve Ricketts, director of marketing for Scansoft Inc., is you can access digital data in multiple ways. "If something is in your file cabinet," he says, "it's more difficult to find six months later because you can't search on content."

You can perform the most basic level of document management on almost any computer and employs the computer's natural file structure. For example, when you scan a document and store it on a PC that runs Win95, it's stamped with a name, date, file size, and file type. Users simply activate the Find utility to locate the document on a connected drive.

Some scanning applications offer a more advanced level of document management,

however. These scanning applications automatically convert scanned documents to text documents using optical character recognition (OCR) software. Then the documents are stored in an index, where you can locate them using the index's keyword search feature. You can index image documents in the same way, except the user must enter the keywords that will identify them in a search.

But what's the point of putting documents on disk? That's an easy question to answer, says Ricketts. "It's all about enhancing productivity, making things easier, improving the quality. Once it's in your PC, there's so much more you can do with it."

For example, a construction company may choose to scan its purchase invoices and store them in a digital index. If the company wants to find out how much it spent on a certain date, it can run a simple search for all the documents that match that date. If it wants to find out how much it spent on nails during the last fiscal year, it can search the index using the keyword "nails" to locate every receipt that includes the purchase of nails.

You can adapt this scenario to almost any situation. For example, the regional sales office of an international company may scan its business-related receipts and transmit them, via E-mail, to the company headquarters. This expedites the reimbursement process, while preventing the receipts from being lost in the mail.

Similarly, homeowners may scan appliance warranties they receive. Then, instead of searching through a disorganized stack of warranties when the refrigerator breaks down, the

homeowner simply uses the keyword "refrigerator" to search the index of warranties and find the appropriate one immediately.

Despite the numerous advantages offered by document management, it isn't for everybody, says Patti Norris of UMAX Technologies.

"Any time you have a scanned image, it's big," she says. "So (document management) really becomes a disk consumption issue. For consumers who have lower-end PCs that have less disk space, we wouldn't encourage them to store documents just to store them. If they're going to be using the documents or really need to have access to them, then that's certainly valuable. But in most cases, it tends to be more of a business application."

Small businesses shouldn't jump on the document management bandwagon blindly, either. It takes some time and effort to make a digital copy of all your documents. Small businesses with limited paper documentation may derive few benefits from a searchable index. These businesses may find it more cost-effective to photocopy important documents and store the originals in a safety deposit box at the bank.

■ **Scan Do.** Considering the cost—many scanners cost less than \$100—and utility of a scanner, it's almost a given that users will be able to justify the expense of a scanner. Whether they're creating a photo collage of a family vacation or archiving purchase orders in a searchable index, scanner users are expanding the horizons of personal computing and making their lives a little easier. ■

by Jeff Dodd

WaveTop. Easier to get than a hotdog at a ball game.



What you get with WaveTop:

Rich multimedia content broadcast directly to your home PC. No modem connection or monthly charges necessary. Instant access to content stored automatically on your PC hard drive. No waiting for your favorite channels to appear. Video clips, music samples, updated news, great games and fast software downloads — complementing your Internet service.

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A Handful Of Handheld PCs

We Review The Latest
HPCs Running Windows CE 2.0



The market for pocket-sized PCs is exploding. Offering easy portability, instant-on access, and no fragile moving parts—they use random-access memory and read-only memory instead of a hard drive—these machines are finding a market with professionals who demand PC-like capabilities on the road, but don't want to carry a full-sized PC.

These devices were once lumped in a broad, somewhat clumsy category called Personal Digital Assistants (PDAs), but today we divide them into more descriptive groups. On the low end of the scale you have electronic organizers, which are essentially calendar, phone number, and address storage devices. On the higher end

you have Handheld PCs (HPCs) and Palm PCs. HPCs, which we review in this article, generally offer keyboard input, touch-screen navigation, and features from word processing and spreadsheet applications to voice recording and Internet access. Palm PCs, which we'll review next month, generally offer stylus input and navigation (with handwriting recognition software) and a more spare feature set, in a smaller and cheaper package.

■ Evolution Of HPCs. The ancestors of today's HPCs, while useful, often fell short of users' expectations. One reason for this was that there wasn't a widely accepted operating

system, so every manufacturer who produced a device had to run it using a proprietary operating system. This resulted in operating systems that didn't look or operate like the ones people were using on their desktop computers. Many of these systems also offered little or no compatibility or connectivity to the desktop, essentially rendering them under-powered standalone machines.

Several manufacturers still produce handhelds that run on proprietary operating systems, but the systems now work with PCs, making them substantially more user-friendly. Real popularity for HPCs arrived in 1996 when Microsoft created its first version of Windows CE, a scaled-down operating system that looks like the Windows 95 (Win95) operating system and communicates seamlessly with desktop systems. Spurred by a universal operating system, a large number of manufacturers are now creating HPCs.

■ Product Evaluations. In this review we'll look at some of the most interesting and innovative HPCs to hit the market in recent months. Our list is not all-encompassing, but we included the units we wanted to test based on previous experience and industry buzz.

All our test units run the current version of Windows CE: 2.0. This version offers many improvements over the first version, including color-screen capabilities, and includes Microsoft Pocket Word, Pocket Excel, Pocket PowerPoint, Pocket Internet Explorer, Pocket Outlook, and Windows CE Services. The "pocket" versions of applications are limited versions of the full programs. Other basic features include simple applications such as the calculator, world clock, and solitaire. Even though the basic CE applications offer most of what a user needs, most manufacturers throw in additional software, which is a good way to distinguish the products.

CE machines can't be tested like regular PCs because there isn't a good way to benchmark them. Our reviews rely mostly on subjective observations on matters such as portability, display quality, memory and storage features, ease of use, and functionality of the additional applications. The products appear in alphabetical order.

C-Series 2015C



The Compaq 2015C's curved clam shell looks different from other HPCs, and it seems more a design of form than function. It's one of the smallest products in the review with dimensions of 3.93 by 7.32 by 1.61 inches. It feels substantial in your hand and weighs more than you'd expect by looking at it (actual weight is 15.2 ounces).

The 2015C's screen is a livable 6.5 inches (measured diagonally) with 256 colors and a 640 by 240 resolution. The quality is good, and a strong backlight makes low-light situations workable. Screen sensitivity is good, although the unit seemed slightly top-heavy as it often tipped over when we tapped the screen with the stylus.

The 2015C's keyboard also gave us some trouble. While most HPCs don't make typing fun, this one makes it downright difficult. A feature we did like, and found on most of our review units, is the one that lets the top row of numeric keys launch applications when used in combination with another key.

Under the hood a 75 megahertz (MHz) processor runs things, and a whopping 20 megabytes (MB) of random-access memory (RAM) and 16MB of read-only memory (ROM) assures plenty of storage and memory. An integrated 33.6 kilobits per second (Kbps) modem makes E-mail and World Wide Web surfing possible, if a less-than-speedy proposition. An AC adapter and a nickel-metal hydride (NiMH) battery provide the power; a PC Card slot offers storage and upgradeability; and Compaq includes a cradle that makes connecting to your PC a fast and easy process.

Compaq bills the C-Series as "the first professional handheld PC" and backs it up with a list of business-friendly applications that include b5Square's *bFax Express*, Odyssey's *Pocket BizCalc*, and CIC's *Quick Notes* and *Spell Checker*. One thing we'd like to have seen on the Compaq (and all the units) is a handwriting recognition program. On this

device in particular, it might make users forget about using the tiny keyboard.

Overall we found the 2015C a decent machine with a few design issues (especially the keyboard), but a nice set of applications, a cradle, and plenty of RAM.

Mobilon HC-4500



The Mobilon's case, which we like, has a straightforward, unadorned look. Opening it requires pressing a release, however, and when we tugged at the case without pressing it, the case pulled apart slightly at one seam (keep in mind this press evaluation unit has probably received some abuse). The unit is in the same size category as the Compaq and Philips, with dimensions of 3.8 by 7.3 by 1.2 inches and a hefty weight of 17.6 ounces.

Mobilon was one of the first HPCs to offer a color screen, and it does it well with 256 colors and a 640 by 240 resolution that's spread out over a 6.5-inch screen. Screen sensitivity was fine, although we did run into tipping problems similar to those of the Compaq (those color liquid-crystal displays must be heavy).

The keyboard is busy-looking, as the designers included separate application launch keys above the numeric keys. As with the Compaq, space is tight, and unfortunately we found it even harder to type on the Mobilon because the keys sit lower and seem to require more pressure.

For hardware, the Mobilon offers a 75MHz processor, 16MB of RAM, 16MB of ROM, and a 33.6Kbps integrated modem. Power comes from an AC adapter or NiMH rechargeable battery. As with most of our review units, the Mobilon includes a PC Card slot. Sharp offers a clever use for the slot in a special digital-camera card that you can buy for \$400. The card contains the lens, and the rest of the Mobilon becomes the camera. We did not review the camera card, but it's an intriguing idea.

For software, Sharp adds several handy applications including *Microsoft Pocket Streets*, a street mapping program, and its own *Image Editor*, for cleaning up the images taken with the optional camera card.

The Mobilon is a good product, although the keyboard makes it somewhat difficult to use. The PC Card-camera option is unique, and might be worth considering, although at \$400 you could purchase a low-end standalone digital camera for the same price.

(NOTE: The HC-4500 may not be in stores by the time you read this article. A Sharp spokesperson says the company's new 4600 model (shipping soon) is essentially the same as the 4500, but offers more RAM.)

MobilePro 750C



The MobilePro 750C is one huge "handheld" PC. You can expect some bulging forearms if you plan to operate this device while standing. With dimensions of 5.4 by 9.6 by 1.2 inches and a total weight of 1.8 pounds, some might argue this silver-toned device is hardly pocket-sized. We liked the MobilePro too much, however, to shoot it down based on size.

Once you open it, the benefits of the machine's large footprint are obvious. They keep the huge, 8-inch, 256-color, 640 by 240 resolution screen that greets you from tipping. The only problem we experienced with the screen was it seemed to glare more than the other units.

Like the screen, the keyboard is huge for an HPC, and it's as close to easy-to-use as you'll find in this category. The keys have a great feel, and they're big enough to actually permit touch typing (with some adjustments, of course). The brain of the operation is a 78MHz processor that's backed by 16MB of RAM and 16MB of ROM. There's an integrated 33.6Kbps modem to keep you connected and an AC adapter and a fancy Lithium ion rechargeable battery (typically lighter and longer-lasting

than NiMH batteries) to supply the juice. Finally, there's a PC Card slot and an individual Compact Flash slot. (Compact Flash is a miniaturized form of storage with no moving parts.)

The MobilePro offers many extra applications, including one of the most useful HPC programs we've seen: handwriting recognition software. Paragraph P.I. Technology's *Calligrapher* made us believers in minutes. Able to recognize writing in cursive, print, or a mixture of both, the software actually recognized our cursive writing better than our print. While the NEC's keyboard is among the best of this review, we found ourselves enjoying writing directly into our Pocket Word documents.

Arguments about size aside, the MobilePro is a well-designed machine that deserves the attention of anyone serious about buying a full-featured HPC. Excellent usability, combined with a killer handwriting-recognition application, makes it our favorite of the bunch.

Phenom Ultra



Like NEC, the folks at LG Electronics decided bigger is better in creating the new Phenom Ultra. Forgoing the smaller size of the Phenoms that came before, the black-coated Ultra offers dimensions similar to the MobilePro at 10 by 5.2 by 1.3 inches and 1.87 pounds.

All that real estate opens up to an 8.25-inch screen with 256 colors and 240 by 640 resolution. We had no big problems with the screen, although it seemed a little less vibrant than the NEC (it also had less glare). Also, like some of the smaller units, it tended to tip the unit when we tapped it (you'd think a unit this size would have a more stable base). The keyboard is good, however. In fact, we liked it the best of all, with the pitch and key response just slightly edging out the NEC (it's really a matter of taste).

As for the rest of the hardware, LG puts a fast 100MHz processor in charge and throws in 16MB of RAM and 12MB of ROM. The

integrated modem offers communications at 33.6Kbps, and an AC adapter and rechargeable Lithium Ion battery keep things running. There's plenty of room for extra goodies down the road, too, as the Phenom offers both a PC Card slot and a Compact Flash slot.

In addition to some great hardware, the Phenom also offers additional applications. From bSquare there are fax and display programs, and from Odyssey there's Pocket BizCalc, Pocket Finance from LandWare, a handy expense management program, is also included.

Strong hardware features and a good application set make the Phenom a product that promises to bring LG into the HPC spotlight. We liked it, and would use it any day, but the NEC (and its handwriting software) edged it out as our top pick by just a hair.



Last year, the Phillips Velo 1 was one of our favorites. It offered an integrated modem and a voice recording feature, items most of the other early units lacked (you'll notice they all have them now). That first Velo was a trendsetter, so we looked forward to seeing what the folks at Phillips came up with for the next generation. We were a little disappointed in the results.

Bucking the industry-wide trend toward color screens, the Velo offers instead a 6.5/16-inch screen with a 640 by 240 resolution and 16 shades of gray. Philips' people say a monochrome screen is easier to see in sun than a color screen and they're right. Philips also argues that color screens cost too much, and it has a point. At \$600, the Velo 500 is considerably less expensive than any other unit in this review.

Putting aside the color display argument, however, the newest Velo failed to impress us. While the rubber-coated case is still among the coolest around with its pocket-friendly dimensions of 6.7 by 1 by 3.75 inches and a weight of 15 ounces, the rest of the hardware seemed to fall a bit short. The keyboard, once again, is

extremely hard to use. Rounded keys offer a high-tech look and better spacing but are difficult to press if you have big fingers.

A 75MHz processor and 16MB of RAM and 16MB of ROM are more than adequate, but the 28.8Kbps modem is slow. Then there's the lack of a PC Card slot. A casualty of designers trying to keep the unit slim, the missing slot limits the unit's expansion capabilities. The Velo does, however, offer a Compact Flash slot so additional storage is possible. Philips also tosses in a docking cradle that connects to your PC and recharges the unit's NiMH battery.

The original Velo offered a nice set of applications, and this one does too, with programs such as bSquare's bFAX Professional, Microburst's *Virtual Courier* (tie into your *cc:Mail* or *MS Mail*), and Spyglass's *Mobile Forms Database*.

Hardware limitations and a screen that gave us the blahs make it difficult to recommend this product. It's still a solid, well-built unit, however, with a nice set of applications and a low price. ■

by Tom Mainelli

For More Information:

C-Series 2015C

\$900

Compaq Computer Corp.
(800) 345-1518, (281) 370-0670
<http://www.compaq.com>

Mobilon HC-4500

\$900 (for the new HC-4600)

Sharp Electronics Corp.
(800) 993-9737, (201) 529-8200
<http://www.sharp-usa.com>

MobilePro 750C

\$900

NEC Computer Systems Division
(888) 863-2669, (978) 264-8000
<http://www.necnow.com>

Phenom Ultra

\$900

LG Electronics USA Inc.
(800) 243-000, (201) 816-2000
<http://www.lgphenom.com>

Velo 500

\$600

Philips
(888) 367-8365, (408) 558-2200
<http://www.velo.phillips.com>

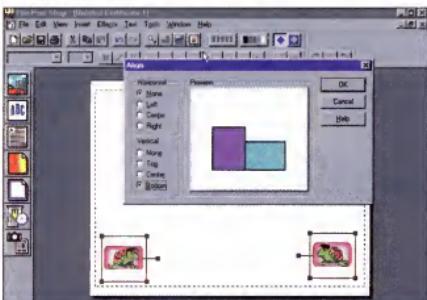
Print Shop Premier

Working With Objects



very Print Shop Premier Edition 5.0 project contains a mixture of text and graphic objects consisting of text blocks, headlines, clip art, photographs, lines, and borders. Contents may differ among objects, but each one functions as a container you can manipulate.

For example, point to an object, then select it by clicking. Sizing handles appear at each corner of the selected object. When you rest the pointer on a selected object, the cursor changes to a hand. You can drag the object to move it to a new location or drag a corner handle to enlarge or shrink the object. If you right-click a selected object, Print Shop displays a menu of editing options. (To select an object and display its pop-up menu, simply right-click the object.) The particular command combination available in the pop-up



Print Shop's Align command under the Effects menu lets you line up two or more selected objects along an imaginary vertical or horizontal line.

menu changes according to the selected object. For the most part, however, you'll see options to cut, copy, delete, or duplicate the selected item. In addition, there are frame and flip options.

Flip. Print Shop's Flip command is available as an option on both the Effects

menu and pop-up context menus. It lets you change the direction of the selected object. You can flip an object horizontally, vertically, or both. To Flip an item, select it, choose the Flip command, then choose an option from the Flip nested menu.

The Flip command comes in handy when used alone or in tandem with the Duplicate command on the Edit menu (Edit, Duplicate). Select an object, then the Duplicate command. Drag the copied object to a new location. Select the copy, choose the Flip command, then choose Horizontal. Alternatively, right-click the copy with the mouse, point at Flip, then choose Horizontal.

Align. When referring to paragraph text, "align" describes how characters line up in relation to the left or right margin, whether they line up down the middle (centered) or if they line up flush along both sides (fully justified). When paragraph text is left-justified, characters on the right side of

the paragraph are ragged and don't line up. In right-justified text, characters are ragged on the left.

If you use the term "align" to describe a text or graphic object (not its contents), it refers to the object's position relative to another object. When you use the Duplicate command to create a copy of a selected object, you can improve the visual effect by choosing Effects, Align to make the second object line up

with the first.

Print Shop's Align command is grayed out (unavailable) when only one object is selected. To align two or more objects, click the first object to select it, then press and hold the SHIFT key as you click other objects to select them. Choose Effects, Align or right-click a selected object, then choose Align from the

context menu. Print Shop presents the Align dialog box with several options. For example, to have objects line up on their left sides along the same imaginary vertical line, choose Left in the Align dialog box's Horizontal section and None in the Vertical section. To place the bottom of each object on the same imaginary horizontal line, choose None (in the Horizontal section) and Bottom (Vertical section). Print Shop previews your selections in the Preview window using samples rather than objects currently selected on the Design Desk. When you like what you see, click OK.

Rotate. Flipping an object lets you turn it 180 degrees (either left/right or top/bottom). To turn an object more or less than 180 degrees, you either drag on its rotate handle or use the Effects, Rotate command. Note that Rotate is unavailable until you select an object.

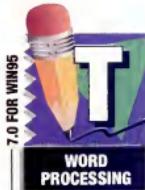
To rotate an object around its center by dragging its rotate handle, select the object to make the handles appear. Place the cursor on the central handle. When the pointer changes from an arrow to a rotate tool, drag the handle to manually rotate the object. To restore a rotated object to its original position, select Edit, Undo Rotation immediately after you complete a rotation.

For more precise control over the angle of rotation, select Effects, Rotate, then choose left or right to turn the selected graphic 90 degrees. Choose Other to rotate the selection by a specified number of degrees. You can enter a degree of rotation in the Degrees box or click an area on the rotation dial. Print Shop displays the effects of your choices on a sample object in the Preview window of the Rotate dialog box. Click OK when you like what you see. To rotate several objects simultaneously, press and hold either the SHIFT or CTRL key as you click each object. ■

by Carol S. Holzberg, Ph.D.

WordPerfect 7

Comment Electronically



Viewing comments on the screen is an efficient method of gathering input on a document, especially when more than one person is reviewing the information. Comments from different people can be distinguished using names, initials, and colors. Once comments are created, they can be edited, converted to regular text, hidden, or displayed. You can insert them anywhere in document text, including footnotes, endnotes, and outlines.

Create A Comment. The first step is setting up your user preferences so you are identified in your comments. Open the Edit menu and choose Preferences, Environment (Edit, Preferences, Environment). Under User Info For Comments and Summary, enter your name, initials, and a user color to distinguish you from others. Then choose OK and Close. Each person who will be making comments needs to provide this information to make it clear who is providing the input.

One way to create a comment is to select the text you want to appear as a comment. Then select Insert, Comment, Create. WordPerfect will create the comment instantly, and the text you selected will be cut from the document and inserted into the comment.

An alternative method is to place the insertion point where you want the comment to appear. Click Insert, Comment, Create. The Comment screen and feature bar will appear. Type your comment text. To include identifying information for your comment, use the feature bar to add your initials, name,

date, and time. (The Initials and Name buttons won't work if you haven't previously specified your initials and name by using Edit, Preferences, Environment.) Choose Close to return to the document.

Maybe you decide you were a little harsh with your comment and want to change it before your colleague reads it. To edit a comment, place the insertion point near the comment. Choose Insert, Comment, Edit. The Comment screen will reappear. If it doesn't contain the comment you want to edit, click the Previous or

Another way to view comments is to choose View, Zoom, Page Width. Rectangular icons will appear in the left margin. If personal preferences have been specified, the icons will contain the commenters' initials. When you click an icon, the comments will appear in a comment balloon. The balloon will be color-coded if user preferences included a color to distinguish the input of each person.

Viewing in Draft lets you read all the comments at once. If you use the Page Width option, you can only view the comment text one comment at a time.

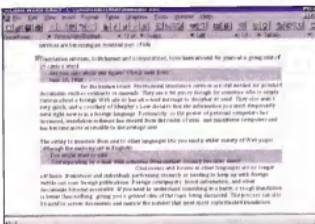
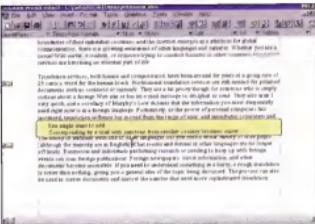
You also can see the icons and comment balloons by selecting View, Two Page, but the text will be too small to read. It's still a useful method for quickly seeing where comments are located on the pages.

■ **Finer Points.** To delete a comment, right-click the comment or comment icon, then click Delete. You also can click the comment code in the Reveal Codes window and press DELETE or drag the comment code out of the Reveal Codes window.

To hide all comments, even when the Draft or Page Width views are selected, choose Edit, Preferences, Display. Under the Documents tab, deselect the Comments check box. Comments will be inaccessible until you reselect the Comments check box.

To incorporate a comment into a document, you can convert it to text. Place the insertion point after the comment you want to use as part of your text. Choose Insert, Comment, Convert To Text. The comment should appear as part of your text, but may need some editing to delete extra information such as initials and the date. If you change your mind and want to convert the text back to a comment, select the text to convert. Then select Insert, Comment, Create.

Normally, comments won't print unless converted to text. Print a single comment by choosing Insert, Comment, Edit. Make sure the comment you want to print is displayed in the Comment screen and choose File, Print. ■



The Draft view shows comments in gray. The Page Width view can show them in color.

Next button to move to the appropriate comment. Make your changes and click Close.

■ **View Your Notes.** Once you create comments, you can view them two ways. Display comments in shaded gray within the document by selecting View, Draft. If the comments don't appear, that option may be deselected. Choose Edit, Preferences, Display. Click the Documents tab and select the Comments check box.

by Diane Kavc Walkowiak, M.A.



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Lotus 1-2-3 5.0

Using The Drawing Tools



Lotus 1-2-3 provides 11 helpful drawing tools for making spreadsheets more user-friendly. Drawn objects are great tools to use whether you want to draw attention to specific data or just spice up a spreadsheet.

Drawn objects are graphics or charts you can select, move, resize, and style independently of the spreadsheet cells. A drawn object and the styles you apply to it do not affect the cells behind it because they are independent elements in your spreadsheet. Lotus 1-2-3 places the drawn objects in front of the cell, without writing over the contents of the cell.

Object Creation. Click the Tools menu and select the Draw command to display the available tools. You can draw lines, polylines, arrows, rectangles, rounded rectangles, arcs, ellipses, and polygons. The Freehand tool lets you draw a freehand object, not confined to any set shape. You also can create text boxes and macro buttons.

To draw an object such as a line or ellipse, click the desired tool. After the cursor changes to cross hairs, position the cursor where you want to start drawing and click and drag to create the object. To constrain an ellipse so it becomes a circle, or a rectangle so it becomes a square, hold down the SHIFT key while clicking and dragging the object.

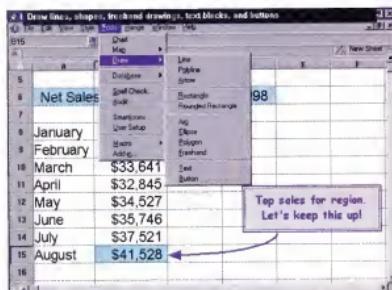
Special Objects. Most of the objects you can create are straightforward. A few of them (such as polylines, polygons, arrows, text boxes, and macros), however, are a little more exciting.

When you click and drag to create an arrow, the head of the arrow will be on the end where you finish dragging. You can change the location of the arrow head or change the arrow so it has double heads (or

no heads) by double-clicking the arrow to bring up the Lines & Color dialog box.

The Polyline tool creates a multi-sided, open shape using straight lines; the Polygon creates a multi-sided, closed shape. To draw them, select the correct tool from the Tools menu under the Draw command, click to start the shape, drag to the next location and click. Then drag to the next point and click to fix that point. Continue dragging and clicking to create the shape and then double-click to finish.

To draw a text box, click and drag to create the size of box you want or click in the



Use the drawing tools to focus your reader's attention on significant data in your *Lotus 1-2-3* spreadsheets.

worksheet to draw the default size. The text block will appear with a blinking insertion point in the upper-left corner. Enter the text by typing or pasting it in and click the worksheet when you finish.

To draw a macro button, click and drag to create a button of the desired size. A dialog box will appear, letting you apply a macro to the button. Once applied, you can run the macro by clicking the button.

Arranging Objects. To move an object, click any part except its handles and drag it to its new location. To move it to another worksheet, select the object and select Cut from the Edit menu. Position your cursor where you want to place the object and choose Paste from the Edit menu.

To resize an object, click it and then click and drag a handle (one of the black boxes surrounding the object) in the direction you want it to shrink or grow. To size it proportionally, hold down the SHIFT key while resizing.

To keep objects together while arranging them on your worksheet, click the first object and hold down the SHIFT key while selecting the other objects. Click Arrange from the Edit menu and select Group to group the objects together. Now you can move them as one and keep their original positions in relation to each other. To ungroup, click Edit, Arrange, and then Ungroup.

Other Arrange commands let you layer objects, flip and rotate objects, lock them so you can't change them, and fasten them to cells.

Appearance Changes. You will probably need to make changes to objects after drawing them. Perhaps you want an arrow pointing a different direction or you want to change an object's color.

To change the appearance of an object, select the object and click Styles, Lines & Color or right-click the object and choose Lines & Color. Use the dialog box options to change the object's line style, width, and color and (if applicable) its background color and pattern. For rectangles, you can select a designer frame. Straight lines, polylines, arcs, and freehand lines can have an arrowhead applied to one or both ends.

In addition to Lines & Color, a text box will have Fonts & Attributes and Alignment options available so you can control the appearance of the text in addition to the text box. To change the text content, double-click the text and make your changes. You also can change Fonts & Attributes for macro buttons. ■

by Diane Kaye Walkowiak, M.A.

Web Browsers

Get Organized With Netscape Message Center



escape designed its *Communicator* as an all-in-one electronic communications tool. The Message Center component helps users immediately know what is incoming, outgoing, and unnecessary.

The Message Center is accessible from the Communicator menu of any Communicator application, such as *Navigator* or the *Messenger Mailbox*. The Message Center window shows information on all mail folders and discussion group folders at once, including the number of new messages in each folder so users can decide where to spend limited time.

The cozily small assortment of buttons on the toolbar provides access to the main Message Center features. The Get Messages button, picturing an arrow and some papers, commands Message Center to retrieve new E-mail messages. The New Message button next to it starts a new message to be sent through E-mail or delivered to a discussion group. The New Mail Folder button creates a new folder or subfolder for E-mail messages. Finally, the Add Discussion Group button brings up a screen for subscribing to new discussion groups.

Sort It Out. Message Center makes the most sense for users who take advantage of Netscape's mail filtering capabilities. Mail Filters (under the Edit menu) can sort incoming mail into different folders based on who sent it, whether it contains certain text in the subject line or body of the message, and a variety of other criteria. Once the new mail has been retrieved and sent off to its destination subfolders based on user-created rules, the number of new messages waiting in each folder will appear in Message Center.

In the main Message Center window, double-click the folder you want to see. Single-click the plus/minus signs in the hierarchical folder list to expand and collapse branches. Users who enjoy using the

keyboard can press arrow keys to select the different folders. The Spacebar expands and collapses branches, and pressing ENTER opens the selected folder or group.

Three pieces of information appear in the main window: the name of the folder, the number of unread messages, and the total number of messages. The two arrows at the end of these column headings can be used to remove columns, although there probably is no real reason to do this since the window leaves plenty of space for the three columns even on small displays.

Under the View menu users can hide the Location Toolbar, which seems to do little in Message Center but take up space. The View menu also offers the Move Folder command, a task accomplished more easily with the mouse. You can drag subfolders from one folder to another; dragging one to the root folder (called Local Mail by default) will cause a subfolder to be listed at the top level with the main folders.

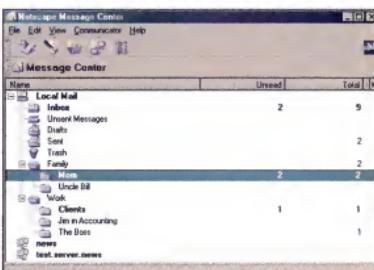
Using the New Mail Folder button and the mouse for dragging, set up a folder scheme that makes sense to you. Family members might have separate subfolders under a top-level "Family" folder, for instance, with business contacts tucked in another folder. Mail filters then can be set up to route all these messages to their appropriate homes.

Folder Options. Right-clicking a folder brings up several useful options. Along with commands for renaming and deleting folders, the program offers shortcuts to the Search Messages and Folder Properties dialog boxes. Choosing Search opens up a search box with the selected folder already listed in the top drop-down menu. Use the other drop-down menus to find messages based on selected attributes.

The Folder Properties dialog box, also accessible under Message Center's Edit menu, gives

users yet another way to rename a folder as well as view pertinent statistics. Here you easily can see how much space a particular folder is using on your hard drive. A button labeled Clean Up Wasted Space compacts the folder to make more drive space available. Note that this Compress command is also available by right-clicking a folder in the main window.

Right-clicking a newsgroup (discussion group) server name is the best way to view server properties, reach the box for subscribing to new groups, and remove servers from your list. Choosing Update Message Count tells Message Center to go online and find out how many new unread mes-



Netscape Communicator's Message Center provides users with a quick overview of their message folder status.

sages in your selected groups await perusal on the server. A Search Messages option brings up a search screen similar to the one we saw in the E-mail section. It will look for discussion group messages based on your interests.

The various tools Message Center offers can be found elsewhere in Communicator's Messenger and Collabra components. For organized people who find themselves overseeing a continually expanding assortment of message folders, however, the Center is a great place to get the big picture. ■

by Alan Phelps

Going Online

Hook Up To AOL On The Road



merica Online has its drawbacks as an Internet service provider. But the bright side to working with such a massive company is nearly nationwide access. America Online (AOL) doesn't promise a modem in every pot, but most medium-sized or larger towns seem to offer a local number where travelers can dial in toll-free and hear that slightly maniacal "Welcome!" No matter where you may be, your modem-equipped portable PC (or desktop PC if you happen to lug it along) can hook up and use the same AOL username, password, and software that works at home. This helps travelers keep up with their electronic lives even when they're on the road.

Whether you use AOL's version 3.0 software or the always-soon-to-be-released version 4.0, finding a new local number and dialing it away from home is relatively painless.

AOL 3.0. To connect from out yonder with 3.0, start the program. In the first Welcome box (the one that says Setup, Help, and Sign On at the bottom) click the Setup button. Then click the Create Location button in the Network & Modem Setup box.

The Network Setup box then pops on the screen. Next, you will fill out some of the information and let AOL do the rest. Type in a name for the location in the box at the top and select the proper modem speed in the appropriate drop-down menu.

Next you must figure out some things about your phone away from home. If it uses

Touch-Tone service (most do) you won't need to switch those radio buttons. You may need to put a checkmark next to Use The Following Prefix To Reach An Outside Line, especially if you are staying in a place such as a hotel. The default option is the number nine and a comma (9,), which tells the modem to dial a nine, pause for a moment, then continue with the phone number. Sometimes you might need to change the nine to another number, add a second nine after the comma, or perhaps put in another comma or two if the single pause isn't working. This might take some experimentation. Try dialing a normal number with the phone to your ear to see how it works.

When you finish, click Save to go back to the first Setup box and then click OK. Now you're back at the Welcome screen. If you look at the tiny type above the Setup button you can see the name of the location that you typed earlier.

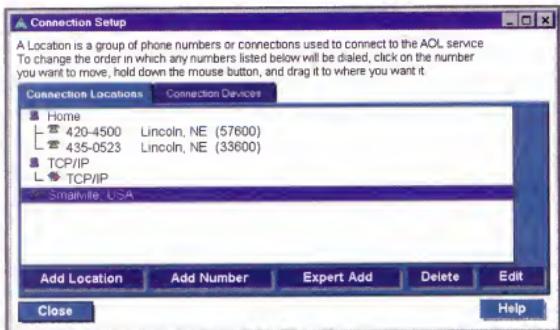
If you're unfamiliar with the area, it isn't always easy to tell which of these numbers really are local numbers. One idea is to look up in a local phone book which exchanges are local calls from which towns. If none of the numbers seems to be local, click the Can't Find A Local Number button to search nearby area codes.

If there is no local number available, AOL does offer an 800 number customers can dial from anywhere. The catch is it costs \$6 per hour on top of normal AOL fees to connect this way. To set up the 800 number, look for a local number as before but enter "800" for the area code instead of your real area code.

Follow the on-screen instructions to choose the numbers and get back to the main screen. AOL will automatically dial in on the new local number, and you can use the service as always. When you return home, remember to click the Setup button again and switch back to your original location.

AOL 4.0. With 4.0, the steps for switching locations are largely the same, but the developers have jazzed things up a little to make it even easier. Click Setup as before to reach a hierarchical display of locations and their related phone numbers.

To add a new location, click the Add Location button. Type a name for the location and click the Next arrow. Now enter the area code, click the Next button again, then enter dialing options according to the on-screen instructions. AOL dials up the special 800 number, and you're in business. ■



The AOL 4.0 software features a better way to add new access numbers for reaching the on-line service, but even in version 3.0 the process is simple.

In the drop-down Screen Name menu, choose New Local#.

Click the Sign On button, and AOL dials a special 800 number to download local access numbers. At the prompt, type in your current area code and click the Continue button. AOL will search for local numbers in that area code and return a list from which you can choose the best options.

by Alan Phelps

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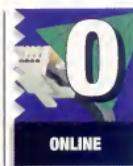
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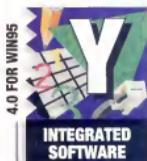
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Microsoft Works 4.0

Easy Formats



You can reach all of Works' formatting options, from setting up fonts to indenting paragraphs to using borders, through the Easy Formats dialog box under the Format menu. Works comes with 25 Easy Formats—from subheads to mastheads to coupons to quotations. As you go up and down the list, a sample of each style appears to the right, including shading and borders when applicable. A description of the format appears below.

■ **The Description.** The first line of the description usually covers the font. The words "Arial 8, Italic, Auto Color" mean that the font is 8-point Arial, italicized, without a new text color.

The next lines usually describe alignment and spacing. For instance, "Left Aligned, Left Indent 1", Right Indent 1", means the text alignment is to the left and indented an inch on both sides. The word "Bullet" means that a graphical element, usually a small circle, sets off each paragraph.

Next, is the explanation of the vertical format. "Line Spacing 1li, Space Before 24pt, Don't Break Para" means one blank line ("1li") goes between each line of text, 24 points of space precede each paragraph, and a paragraph ("Para") won't be split onto two pages.

Finally, the description of any borders and shading appears. "Dotted Cyan Border, Fill

Style: Lt Horizontal Black Blue" means the text is in a box with a dotted cyan border and shaded with the color blue, with thin, black horizontal lines and black text.

If any of these formatting aspects are not covered, or are listed as Auto, the Easy Format does not alter them. For instance, the Hanging Indent Easy Format only covers alignment and indentation; it leaves everything else alone.

■ **Easy Formats.** If you find an Easy Format that's not quite what you want, altering it is simple. First, select Easy Format from the Format menu and select a format. In the Easy Formats dialog box, click the Change button.

To base a new Easy Format on formatted text in your document, highlight the text, and then click the New button in the Easy Formats dialog box. Works automatically lists the formatting specifications, and you can type a name for the new format.

Whether you're modifying a format or creating a new one, when you finish adjusting the settings, click Done. Then, you can click Apply (to format selected text) or Close to exit. (NOTE: If you haven't made any changes, the Close button won't be available. Click Apply or Cancel.)

The shortcut icon for Easy Formats, a piece of lined paper with a star in one corner, appears by default on the toolbar. If you click it, you can opt to Create Selection, in which case Works jumps you straight to a New Easy Format with specifications for the highlighted text. You also can jump straight to recently used Easy Formats, or choose More Easy Formats to reach the Easy Formats dialog box.

■ **Add The Power Of Easy Text.** You may be familiar with Easy Text, which automatically enters text, usually in the same formatting style as the rest of the paragraph. When you get comfortable with the Easy Formats, you can apply them to Easy Text. For instance, if you have an Easy Text to close your letters, you could format Easy Text to automatically indent.

Select Easy Text under the Edit menu, then pick an Easy Text. Click the Format button and select an Easy Format. Click Apply and make sure you check the Insert With Formatting box. Now, whenever you insert that Easy Text, the formatting will be automatic.

Easy Formats are a simple but powerful way to increase your productivity. If you take the time to set up a few, your finished product won't disappoint you. ■

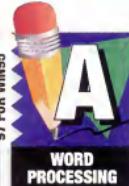
Through the six buttons that appear, Font, Borders, Shading, Paragraph, Bullets, and Tabs, you can change the Format Settings, just as you would within the document itself. (NOTE: The *Borders and Spacing* buttons bring you to different page tabs on the same dialog box.) If you cannot select a button, the Easy Format does not control that aspect of the format.

You'll have to create a new Easy Format. To replace the old Easy Format, don't change the name in the Type In The Easy Format Name Below field; to create a new one, type a new name.

by Sarah D. Scalet

Microsoft Word 97

Boxing Text



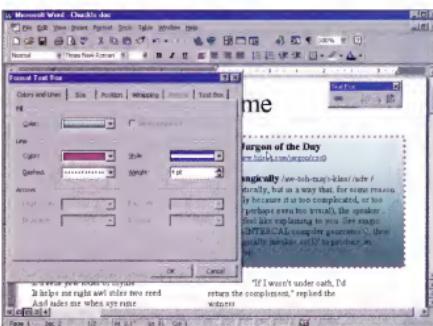
Although it's optimized for word processing, Microsoft Word 97 incorporates several sophisticated desktop publishing options. For example, it lets you create a multicolumn, multipage newsletter, complete with linked text boxes. Once you link the two boxes, you can pour text into one and have the "overrun" automatically flow into the other, even if the box is in a different column or on another page. The layout tools in Word can add visually appealing borders and colors to text boxes.

In Word, you insert text boxes to position selected text or pictures on a page. You either can select existing text and enclose it in a text box or create a text box, then type in or paste the contents.

To enclose existing text in a text frame, select the text, then choose Insert Text Box from the Format menu (Format, Insert Text Box). Word places a box with eight handles around the text. To resize the box, rest the cursor on a handle until the pointer changes to a two-headed arrow. Then drag the handle to enlarge or shrink the box. Next, place the cursor on the text box border until the pointer changes to a cross-hair cursor with four arrows, then drag the box to a new location.

You can change the way text wraps around a text box, or frame it with a border, by clicking once inside the text box to select it. Slide the pointer to the edge of the text box. When it changes to a cross-hair cursor with four arrows, right-click. Choose Format Text Box from the pop-up menu. Click the Wrapping tab in the Format Text Box dialog box, then make selections from the Wrapping Style and Wrap To options presented. For absolute precision, enter numerical measurements in the Distance From Text boxes to determine the space between document text and the edges of the text box.

To ensure the text box stays put, instead of moving with the text to which it is currently



The Format Text Box dialog box is the place to spice up text boxes with features such as color fills and borders.

anchored, click the Position tab in the dialog box. Remove the checkmark from the Move Object With Text box. Click OK to close the dialog box. Repeat these steps for each text box in your document.

To add fill color to a selected text box, click the Colors And Lines tab in the Format Text Box dialog box. Click the down arrow of the Color box in the Fill section of the Colors And Lines tab and choose a color. Click this down arrow again and choose Fill Effects from the pop-up menu to choose a gradient fill and shading style. You can lighten or darken the fill effect by adjusting the Dark/Light slider in the Colors section of the Gradient tab. Click OK when you finish.

Frame the text box with a color border by clicking the down arrow to the right of the Color box in the Line section of the Colors And Lines tab, then click a color. Choose a line style from the Dashed drop-down list, then select its thickness from the Style drop-down list. You also can choose a line thickness by entering a point value in the Weight box. Click OK.

All The News That Fits. To create a text box for new or existing text, choose Insert, Text Box. Word switches you to Page Layout view (if you're not already there). Position the cross-hair cursor at the top-left corner of the area where you want the box to appear. Drag

the mouse to enlarge the box to the appropriate size.

A text box appears with handles and a border to indicate that it's selected. The Text Box toolbar should also appear. If it doesn't, right-click a button-free area on any Word toolbar, then choose Text Box. You either can type text directly into the text box or paste text copied from another document. If you plan to paste, you can create text boxes in different locations, then link these boxes so spillover from one box automatically pours into the other. It's easier to link boxes if you create them first.

To make room for a second text box on another page, you might have to choose Insert, Break, then select Page Break from the Break dialog box. Once you have two boxes, copy the article you want to paste to the Clipboard, click inside the first text box, then choose Paste. With the first text box still selected, click the Create Text Box Link tool on the Text Box toolbar. The cursor changes to a pitcher. Click the second text box to create a forward link to it and pour the remaining portion of the pasted text. Once you paste text into place, right-click a text box border to adjust text box formatting. ■

by Carol S. Holzberg, Ph.D.

Microsoft Excel 97

Looking Up Your Data



hen you need to quickly obtain a phone number, you look it up in a phone book. You can find the information you want because you look up a specific piece of information (usually the last name) to find its associated information (the address and phone number). Excel's VLOOKUP function works the same way.

You can use VLOOKUP to find information in a table based on a specific piece of data, then to pull out associated information. For example, you can use the VLOOKUP function to find a specific company's tax rate from a table.

How does the function locate the information it needs? By searching the left column of a table for a specific value, you can return a corresponding value from the same row (but a different column). Because of this, you usually set up your table to include unique values in the left column (such as a customer number) and then have Excel retrieve the associated information (such as the customer's address or tax status) from another column. You can use VLOOKUP to search for exact matches (such as finding a customer number) or for the nearest value that is less than or equal to the search value (such as assigning a B grade to a student with a grade average of 83%).

Setting Up Your Reference Table. Before you use the VLOOKUP function you must first set up a reference table. The left column of your table should include the reference information you use to look up information on the table, such as a customer number, part number, or numerical amount. The other columns include information related to the first column's data. For example, if the first column includes a customer number, the other columns might include the customer's credit limit, address, and tax status.

As you set up your table, make sure the values in the left (reference) column are

sorted in ascending order, from lowest to highest value. This is important because VLOOKUP works by going through the data in this column until it finds either an exact match or a number that is larger than the look-up value. If it finds a value larger than the look-up value, it uses the next lower value in the column; it can't do this accurately if you haven't set up the reference column in ascending order.

Using VLOOKUP. After you lay out your reference table, you're ready to use the VLOOKUP function. As usual, you must set up the function in an exact way: =VLOOKUP(*look-up value, look-up reference, column number, nearest*). The first argument, look-up value, is the reference value that Excel tries to match (or come close to) as it examines the left column. The second argument, look-up reference, is the range that contains the table. The column number is the column (numbered from left to right) that contains the information you want Excel to find. The final argument (nearest) is optional and used to indicate whether you want Excel to find an exact match, or if an approximate match is fine. If you enter TRUE for this argument (or leave it blank), Excel finds the closest value that is less than or equal to the look-up value, an approximate value. On the other hand, if you enter FALSE, Excel looks for an exact match.

To try your hand at this function, enter the data shown in Figure 1 (except in column F and row 19). Then, in cell F2 enter the =VLOOKUP(E2,\$A\$2:\$B\$8,2) formula to look up a student's numerical grade on the table and return a letter grade. In this formula E2 is the look-up value, the number you want Excel

to match in the table's left column. Since there is no exact match, Excel finds a value that is less than (or equal to) the amount: 80. The next argument, \$A\$2:\$B\$8, indicates an absolute value for the look-up reference, the range that contains your table. Finally, the last argument (2), indicates from which column (second from the left) Excel should pull the answer.

Instead of finding an approximate value in the look-up column, you can use VLOOKUP to find an exact match. To see this, enter the customer number (1023) for which you want to find information in B19; then enter =VLOOKUP(B19,\$A\$11:\$D\$17,3, FALSE) in cell C19. Excel looks at the data in cell B19 and tries to find an exact match in the reference column of the customer table. If Excel

Figure 1: Do you find it a hassle to locate information on a table? Let Microsoft Excel 97 look it up instead.

finds a match, Excel returns information (Taxable) from the third column of your reference table.

Save yourself the trouble of looking up table values manually by using this versatile and time-saving function instead. ■

by Linda Bird

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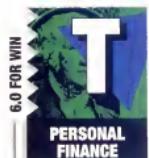
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Quicken Deluxe 6.0

Investment Tracking, Part II



To make the most of your investment dollars, it's important to make wise choices. To make wise financial choices, you need access to the latest information. *Quicken* provides financial news and tips through Quicken Live, the software's gateway to current news on the Internet.

Last month, in the first part of this two-part series, we discussed using Quicken Deluxe 6.0 to track your investments. This month, we'll discuss using Quicken Live to find investment news and helpful World Wide Web sites.

Quicken Live. Quicken Live, designed to provide you with timely financial information, encompasses all of Quicken's online features. Features offered with Quicken Live include online quotes (with a 15-minute delay), connections to popular financial Internet sites, tips for using Quicken, information on Intuit products, and software updates to your version of Quicken. You can use all of Quicken Live's features free, for one year.

To use Quicken Live, you'll need to set up Quicken to work with your existing online connection. Click the Features menu, the Online submenu, the Quicken Live Setup submenu, and the Internet Connection Setup command. Mark the I Want To Use An Existing Dialup Internet Connection radio button and click Next. Follow the instructions on the screen to select your Internet service provider (ISP) and your Web browser.

Open the Quicken Live window by clicking the Features menu, the Online submenu, the Quicken Live (Internet) submenu, and the Best Of The Web command. Click the What's New tab to see tips for using Quicken more efficiently and information about Quicken Live. Click the Financial Network tab to access the various features of the Quicken Financial Network, most of which are fee-based. (NOTE: At the time of this

writing, *Intuit* was still constructing information under the Financial Newsstand tab.) The Best Of The Web tab is where you'll find the most helpful financial information, though.

Update. The first time you use Quicken Live (or if you haven't used it for a few months), it's a good idea to click the Update button in the top-left corner of the Quicken Live window. You then can update Quicken Live, including the latest Quicken tips and patches. Follow the instructions until you reach the Update Features window. Select the features you want to update and click the Update Now button. Using the Update button is especially important because of the recent changes Quicken Live has undergone.

Best Of The Web Changes. The first thing you should note about the updated Best Of The Web window is it no longer contains reviews of Web sites. All reviews and listings of Web sites under each category are contained entirely at the Quicken Web site. (NOTE: If your Best Of The Web window contains reviews, you'll need to perform an update as described above.)

You may see several category icons along the left side of the Best Of The Web window, but they may no longer be active. Scroll through the box in the middle of the window to see the new list of categories, which include Banking & Borrowing, Home & Mortgage, Insurance, Investments, Retirement, Saving & Spending, and Taxes.

Move the cursor to the site you want to see, click it, and then click the Visit Site On Web command under the pop-up menu. Quicken should open the Web browser you selected earlier and open the Web site containing the category you selected. (If you have trouble hyperlinking to Quicken Live through the Quicken software, you can access the information at <http://www.quicken.com/qlive> on the Web.)

Each category contains five to 10 reviews of Web sites as well as links to related Web sites. For instance, in the Taxes category, you can link to Web sites containing news about upcoming tax changes, news from the IRS, and help with tax preparation. Other related sites in the Taxes category include sites devoted to reducing your taxes, online tax filing, and state taxes. To view a Web site, click its link. To return to the Taxes category page, you'll have to use your browser's Back button; the navigation path through Quicken Live is poor.

To move to another of the seven categories, you have two choices. You can minimize your

[Text Only Version](#)



IRS Discovers Cure For The Uncommon Tax Problem



Through Quicken Live you can connect to dozens of finance-related World Wide Web sites, including a daily newsletter from the Internal Revenue Service.

browser's window and maximize the Quicken window so you can use the Best Of The Web window and click the next category you want to visit.

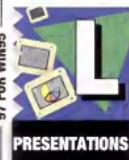
You also can visit a new category page by clicking the category's hyperlink at the bottom of all Quicken Live Web pages. When you reach the new category's page, you'll see a mixture of news and information pertinent to that category. To see the Quicken Live Web site reviews for the new category, scroll down until you find the Other Web Sites hyperlink along the left side of the window and click it.

It's easiest to navigate exclusively through the Quicken Web site to move between categories. You'll have access to a multitude of other features as well using this method. ■

by Kyle Schurman

PowerPoint 97

Creating & Using Hyperlinks



ast month's tutorial showed you how to create a custom *PowerPoint* slide show. We also focused on using the Slide Show shortcut menu to jump to the custom show.

This month we look at a more seamless and efficient way to leap to a custom show: creating a **hyperlink**. These are text or objects to which you assign a mouse action. You can click a hyperlink to jump to slides, presentations, files, or even World Wide Web sites.

■ Linking To Custom Shows.

Before you create a link to a custom show, develop the show and save the presentation. (If you need a refresher on how to do this, see last month's PowerPoint Quick Study.) Next, switch to Slide view and display the slide where you want to place the hyperlink. Select the text (or object) to which you want to add a hyperlink; then

open the Slide Show menu. Choose Action Settings. On the Mouse Click page of the dialog box, click the Hyperlink To option button and drop-down list arrow; then choose Custom Show. In the Link To Custom Show dialog box, select the custom show you want from the list. It's also a good idea to check the Show And Return box in this dialog box so the slide with a hyperlink redisplay after you view the custom show. Click OK in all open dialog boxes.

Hyperlinks become active when you run a slide show, so to test the link you must first click the Slide Show button. In the electronic slide show, rest the mouse pointer over the hyperlink until a hand icon displays; then click to jump to the custom show.

You can advance through the custom show by clicking the mouse button. When PowerPoint finishes running the custom show the main presentation appears again.

■ Jumping To Other Locations.

You can create hyperlinks to other locations in a similar fashion. First, select the text or object to which you want to attach the link and choose Action Settings from the Slide Show menu. On the Mouse Click page, click the Hyperlink To option button and its drop-down list arrow. Select various locations on the list from within the current presentation, such as Next Slide, Previous Slide, and Last Slide Viewed. Alternately, you can choose Slide from the list to display the Hyperlink To Slide dialog box. Choose a slide title on the list, then click OK in all open dialog boxes.

You also can create a hyperlink to another presentation. For example, you might want to quickly display a presentation that includes supporting data for your main presentation. In the Action Settings dialog box click the Hyperlink To option button and drop-down list arrow; then choose Other PowerPoint Presentation from the list. In the Hyperlink To Other PowerPoint Presentation dialog box, double-click the file you want.

You use similar commands to create hyperlinks to files not created in PowerPoint. For example, you might want to display a Microsoft Excel chart to back up ideas in your presentation. To do this, choose Other File on the Hyperlink To drop-down list. In the Hyperlink To Other File dialog box, double-click the file you want.

Finally, you can add sound to a hyperlink. To do this, click the Play Sound check box in the Action Settings dialog box. Click the drop-down list arrow; then choose a sound from the list. When you finish setting options in the Action Settings dialog box, click OK.

To test your hyperlink in a slide show first rest your mouse pointer over the hyperlink until a hand icon (and a ScreenTip) displays; then click.

After you create a hyperlink you may discover you want to modify it. For example, you might want to add sound or change the link location. To change a hyperlink's settings select the object before opening the Action Settings dialog box. Make modifications in the dialog box; then click OK. Finally, you can remove a hyperlink by clicking the None option button in the Action Settings dialog box.

■ Jumping To The Web. For the ultimate in far-reaching links, try adding hyperlinks to the World Wide Web. In the Action Settings dialog box display the Hyperlink To list; then choose URL (this stands for Universal Resource Locator, a Web site's address). Enter the Internet location in the Hyperlink To URL text box before clicking OK. Alternately, you can select the text or object, then click the Insert Hyperlink button. Enter the Internet address in the Link to File or URL text box before choosing OK.

Now you're a pro at creating hyperlinks to custom shows and other locations—and can more easily access information you need. ■



Use the Action Settings dialog box to create or modify hyperlinks that send viewers to other presentation slides and beyond.

by Linda Bird

HTML

Creating A Clickable Image Map



A **image map** is a graphic containing clickable hot spots, which are on-screen locations linked to a command or action. A visitor to your World Wide Web site can click part of the image to move to another Web page, hear a sound, or view a multimedia file—whatever you have linked to that part of the image.

Image maps offer a visually interesting way of navigating your site. They are useful for maps where clicking something, such as a state or country, gives you more information or in displaying an object where clicking part of it gives detail about that part.

Armed with a text editor (a type of program that lets you create and manipulate text files), graphics software, and a suitable picture you easily can create a clickable image map for your Web page. Your image should be a Joint Photographic Experts Group (.JPG) or a Graphics Interchange Format (.GIF) file and could be a button bar or a graphic made up of a number of icons or smaller images.

Defining The Clickable Areas.

Clickable shapes can be circular, rectangular, or polygonal, and each will be a separate link. To describe a shape you need the coordinates of its identifying points. Open the image in your graphics program and for a rectangle, locate the top-left and bottom-right corners by pointing your mouse at each point and reading the coordinates off the screen. These generally appear on the status line. For a polygon find the coordinates of each of its points and for a circle find the coordinates of its center and the length of its radius.

The photo shows a single graphic containing three small pictures, any of which can be clicked to display a information about that landmark. The rest of the image is not clickable.

The code for the image map goes in the BODY of your HTML document. The photo's HTML code is:

```
<IMG SRC = "landmark.jpg" USEMAP =  
#landmarks BORDER=0 WIDTH="489"  
HEIGHT = "395">  
<MAP NAME = "landmarks">  
<AREA SHAPE = "rect" COORDS =  
"20,230,255,360" ALT = "Sydney's Opera  
House" HREF = "op_house.htm">  
<AREA SHAPE = "circle" COORDS =  
"355,190,100" ALT = "White House" HREF  
= "wh_house.htm">  
<AREA SHAPE = "poly" COORDS =  
"150,15,30,185,245,185,150,15" ALT =  
"London's Big Ben" HREF = "bigben.htm">  
<AREA SHAPE = "default" NOHREF>  
</MAP>
```

Understanding The HTML. The tag specifies the graphic used as the image map, and the USEMAP attribute gives it the unique name "landmarks." You can use any name you wish, but the name must be a single word prefixed by a hash symbol (#). And since each image map has a different name, you can have more than one image map on a page.

The <MAP>..</MAP> tag contains definitions for the clickable areas on the image. Its NAME attribute is the name of the image related to it. This is the name used in the tag without the leading hash symbol.

Inside the <MAP>..</MAP> tag pair are a number of <AREA> tags each defining one clickable area on the image.

The SHAPE attribute describes the region as rect, circle, poly, or default. Circles, rectangles, and polygons have their coordinates listed in the COORDS attribute as a comma-separated list of numbers enclosed in quotation marks. Each HREF attribute describes the Universal Resource Locator (URL), sound file, or the graphic or movie clip linked to that shape. For example, the rectangle has its top-left corner at (20,230) and its bottom-right corner at (255,360). It is linked to the page Op_house.htm.

The ALT attribute provides text, which is displayed in the status bar as your visitor's mouse moves over the clickable area. (NOTE: In some older browsers, the text also appears near the link in the browser window.)

The shape DEFAULT does not have coordinates as it is a "catch-all" area, including all parts of the image that are not included in another area tag. Like any other shape it can be linked to a URL, sound file, or, as has been done here, you can use NOHREF to specify it as being "not clickable."

If you include part of an image in more than one <AREA..> tag it will be controlled by the first area tag.

When your visitor moves over a clickable area on the image map their mouse pointer will change shape indicating that the region is clickable. If it is not clear that the image contains clickable links add a prompt so your visitor knows what to do.



The HTML on this page creates three hotspots on the image so a visitor can select any of them to find more information about these famous landmarks.

Caution. Finally, not everyone has images enabled on their browser and others browse using speech-based browsers. When you use an image map, always include text links so these people can still navigate your site. ■

by Helen Bradley

It's a breakthrough any way you look at it.



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QUICK TIPS

Secrets To Succeeding In Common Tasks

Internet

Don't let Windows 95's Dial-Up Networking (DUN) kick you off the Internet. DUN is automatically set up to boot you off if you're idle too long, but you can change that. In the DUN folder (open it under the Start button, Programs, Accessories), right-click your connection icon, select Properties, click the Configure button, click the Connection tab, and uncheck the radio button in front of Disconnect A Call If Idle For More Than "x" minutes.

Opening Files

Many users suffer moments of panic (or at least confusion) when they try to open a file through an application's Open dialog box and can't find the correct file listed on-screen. This often occurs because applications automatically list only their default file types, such as .DOC files for *Microsoft Word* or bit-mapped (.BMP) files for the Paint applet in Windows 3.x. To list every file, not just those of the default type, make sure the Files Of Type box in the Open dialog box shows All Files.

World Wide Web

If you want to save an image you see while browsing the Web, just right-click it. Select Save Image (or Picture) As from the pop-up menu and then choose a place to save it on your hard drive. Respect others' copyrights and check with the site's creator for permission about using such images.

Microsoft Word

There's no need to point and click your way through menus or the toolbar if you want to double-space, or single-space, text in *Microsoft Word* 95 and 97. A couple of shortcut key combinations are the quickest approach. Press **CTRL-A** to highlight all the text in the document. Then, press **CTRL-2** to double-space or **CTRL-1** to single-space.

PC Hardware

All memory is not created equal. If you want to add memory to your computer (or to a specific component, such as a video card) you need to know beforehand what kind to purchase. Several types of memory are available, including SDRAM, VRAM, and EDO. The documentation for your computer or the component you want to upgrade should state exactly what kind of memory you'll need for the upgrade.

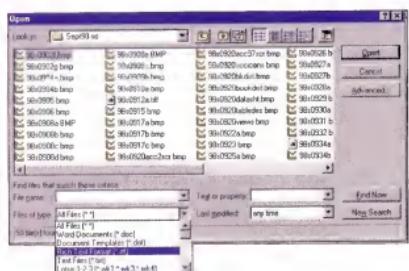
Microsoft Office

If you're using Windows 95 and have Microsoft Word or another *Microsoft Office* application running and minimized on your Taskbar, there's an easy way to open a document. Click the document you want to open and drag it to the Word button (or other application) on the Taskbar. Hold it there with your mouse button depressed until the Word window opens. Now drag the document into the window and release. Word will open it as a separate document.

Internet Explorer 4.0

Explorer 4.0 (and Windows 98) enhances the functionality of your Windows Taskbar by letting you insert frequently used applications as tiny, clickable icons. The four icons included by default are Outlook Express, Explorer, Customize Desktop, and Channels, but you can personalize these in any way you choose.

To remove an icon (you might want to toss the Customize Desktop and Channels icons straight away, since you'll probably never use them!), right-click it and then select Delete from the pop-up menu. To add a new one, simply drag it (from any folder or menu) and drop it into that section of the Taskbar. This feature works with documents, as well as applications.



If a file's missing from your choices in an Open dialog box, check what you're showing with the Files Of Type pull-down menu.

Opening Files

Microsoft Outlook Express

If you're in the middle of typing a message in *Outlook Express* and don't want to hold it open, copy it to a folder so you can come back later and pick up where you left off. In the open

message window, select Copy To Folder from the File menu. In the Copy window that appears, browse to the folder you'd like to save the message to and click OK. You also can create a new folder to save your message in by clicking the New Folder button and then picking a name for your new folder.

World Wide Web

Frames, those separate panes in the windows of the Web, can be a convenient way to display and access information. But they can be a major pane, er, pain, when it comes to printing that information. To print just the frame you want in Microsoft Internet Explorer 4.0, don't select Print from the File menu (or the toolbar). Instead, right-click the frame you wish to print and select Print from the pop-up menu that appears. In *Netscape Communicator*, left-click the frame then open the File menu and choose Print Frame.

Portable PCs

When traveling with your portable PC, always remember to take the CD-ROM or diskette that will restore your system's startup files in the event of a crash. Most portables that run Windows 95 come with the startup files on CD, but if your portable doesn't, take a few minutes to create a startup diskette and prepare in the event of that unmentionable emergency.

Quicken 98

When you void an entry in your checkbook, never delete it from the online registry in *Quicken*. You'll affect the program's ability to balance because it looks for all checks in the sequence. *Quicken* includes a handy keystroke feature designed to deal with voided checks. Put the cursor anywhere in the line for that particular transaction and press CTRL-V. *Quicken* voids out the amount while leaving the information and check number there.

Microsoft Money 98

If you've enjoyed the convenience of automatic payroll deposit, you may as well reap the same benefit from your digital checkbook. *Money* will automatically enter any monthly debits or credits to your account. Go to Bills view and click Bill. You'll be prompted to enter the type of transaction and the amount in question. Check Automatic Entry in the Entry Method box.

PC Hardware

If your pointing device feels out of control, it's probably the result of a little grit and grime. Even a well-kept mouse that roams on a clean surface can accumulate enough gunk inside to interfere with normal operation. Cleanup is simple. Turn over the mouse and find the roller ball. You should be able to release the ball by turning the plastic O-ring that contains the ball (don't lose it). Now check the mechanisms inside for lint and other debris. Remove the gunk with your fingers, a pen

tip, or even by blowing it out. Replace the ball, screw on the cover, and resume mousing.

Graphics

A screen shot is a great way to show somebody exactly what you're seeing on your screen. The bit-mapped file format most users save Windows screen shots in, however, can take up a great deal of space, sometimes more than is available on a single diskette. It's easy to make a bit-mapped file smaller by removing some detail. When you select Save As to preserve your bit map, select a lower setting than the default, high-quality 24-bit setting. Choosing the 256-color, 16-color, or monochrome settings means your image won't look exactly the same, but it will require less storage space.

Ergonomics

Computer users with a tower-based system often have a common problem. If they're more than 5 feet tall they probably have to stare downward at their monitors because the PC is on the floor and the monitor is on the desktop. For maximum comfort and productivity, the top of your monitor should be at eye level. Folks with a desktop PC case can set their monitors on top of the computer so that it sits at about the right level. Owners of tower cases must be more creative. A good solution is to stack a book or two under the monitor to get it to the correct height (just be sure it's stable).

Microsoft Exchange

If you use *Microsoft Exchange* and want to retrieve summaries of your messages before actually reading the mail, set your application to get the first-line overview of each incoming message. Go to the View menu and select Columns. Now, choose Item Text from the menu on the left side, click the Add button, and click OK. Now your Exchange window will display a snippet of text from the message's first line.

Printing

So, you're five minutes from the presentation, you go over to the printer, and you discover your document is in line behind 11 others. If you have Windows 95, this isn't a big problem. Click My Computer and select the Printers folder. Double-click the icon of the printer you're using. Now, drag the document you need printed to the top of the list. The printer will take care of your document as soon as it finishes printing the document in progress. ■



Maintain your mouse by removing the ball and then removing any lurking grime.

PC Hardware

Mightier Than A Mouse

Drop Your Mouse & Pick Up An Alternative Input Device



You need to tell your computer what to do in order for it to work. That's why you need an **input device**, which is any device that sends instructions or information into the computer. A keyboard and a mouse are by far the most commonly used input devices. A couple of mouse clicks and a few taps on the keyboard spring your computer into action. You can use many other devices, however, to send information to your computer.

Input devices are continuing to become more sophisticated, making it easier to input more information with less effort. Retinal and handprint scans are still more science fiction than fact, but the "Star Trek" lovers in all of us are eagerly awaiting these advances. With the constant

changes in technology, they may be here sooner than we think.

But even the current input devices are pretty amazing. Some are for specific tasks, such as art and graphics, while others have ergonomics or increased functionality in mind. Some, such as virtual reality gloves that follow your hand movements, are extremely specialized.

Touch Screens. Touch screens are monitors that can "sense" touch. Rather than click a mouse or use a keyboard, one simply touches the computer screen to input data and give commands. Usually, the interface used

with touch screens consists of button icons that open menus of choices or execute commands. Your on-screen finger-movements, rather than a mouse, control the cursor.

People use touch screens in a variety of environments. They are ideal for situations in which keyboards or mice could easily become damaged, such as in a manufacturing plant. You also can commonly find them in hospitals and retail environments. For example, in a hospital setting, a doctor can use a touch screen to sign a virtual prescription for a patient; in a retail setting, cashiers can quickly and easily ring up sales.

As you might expect, touch screens are pricier than your average monitor. Expect to pay more than \$2,000 for a high-end, 21-inch touch screen monitor.

Trackballs. Trackballs are like upside-down mice. Instead of moving the mouse, you spin the ball on top of the device. All you have to do is spin the ball in the direction you want the cursor to move. A trackball is easier on the wrist than a mouse because there's not as much hand movement; that also means the stationary trackballs require less desk space. The buttons on a trackball are just as easy to use as the ones on a mouse. They are within easy reach of the thumb and fingers and work the same way as normal mouse buttons.

You can use a trackball in any situation in which you would use a mouse. Several companies, such as Logitech with its Trackman

Marble series, produce trackballs.

Most tend to cost a little more than your average no-frills mouse, but you can pick one up for a reasonable price. Look for trackballs to be in the range of \$30 to \$100.

Touch Pads. Similar to trackballs are touch pads. Touch pads are small pads that look a little like an Etch A Sketch. When you place your finger on the pad and move it around, the on-screen cursor follows your finger movement. Most touch pads have buttons like a mouse or trackball. But with touch pads, you also can "click" by tapping the pad, something you can't do with a trackball or mouse. Touch pads first became popular on portable computers, but have moved onto to full-sized PCs.

Touch pads are comfortable to use because, like trackballs, they don't require you to move

your whole hand over a mouse pad, just your finger. A great touch pad is the Power Cat by Cirque. At \$89, the Power Cat is at the higher end of touch pads, but it is definitely worth the extra cash.

Infrared Devices. A new twist on input devices is infrared devices, which let you send information to your computer without a physical connection. Some companies are now making keyboards and remote control-like input devices infrared. For example, Key Tronic makes several infrared keyboards, some with built-in trackballs or touch pads. They operate exactly as a normal keyboard, but you have the flexibility of being able to move to a different part of the room while you type. An infrared sensor that comes with the pointing device is attached to the computer and captures infrared signals from the keyboard.

The Surfman remote control from Logitech is geared toward World Wide Web surfing. It lets you bookmark your favorite pages and move between previously visited pages. A trackball built into the \$90 remote controls cursor movement.

Tablets & Pens & Pucks, Oh My! Have you ever tried using a mouse to draw something in the Windows Paint accessory or a similar program? It's hard to recreate Monet's "White Water Lilies" with a typical mouse. You just can't obtain any sort of "feel" from a mouse, as you would with a brush or pencil. But designing, creating, and manipulating graphics are things that computers are especially good at—provided you have the right tools. The right tools are tablets, electronic

"pens," and pucks. Using these devices, one can create stunning graphics better than anything you could create with a clunky mouse.

Tablets are hard, plastic devices that look like mouse pads and come in a variety of sizes. Any tablet you buy should come with a pen-shaped stylus, which you use to draw on the tablet. Many tablets are pressure-sensitive, meaning that when you press hard on the tablet, you will see the effects of the extra pressure on-screen. If you are drawing a line, for example, you would see it get darker by pressing harder on the tablet.

The tablet prices vary greatly because they often come with software or hardware accessories, such as an image editing program or a puck. This input device is similar to a mouse, but has a clear window with built-in cross hairs, which provides the user with greater precision. You should be able to find a basic tablet about the size of a mouse pad for around \$100. Larger tablets, with added software or hardware, can cost several hundred dollars. Wacom, one of the best known makers of tablets, sells an 18-by-25-inch tablet for more than \$2,000!

Of course, a tablet won't do you much good if you don't have a pen or stylus to draw with. You should receive a stylus with whatever tablet you buy, but you also can buy pens separately to meet your specific needs. For example, you can buy a pen that feels and operates like a mechanical pencil, or you can buy a pen with ink for writing on paper and a special attachable tip for drawing on tablets. Some pens even have built-in "erasers."

You can use a pen and tablet for more than graphics. Together, they operate just like a

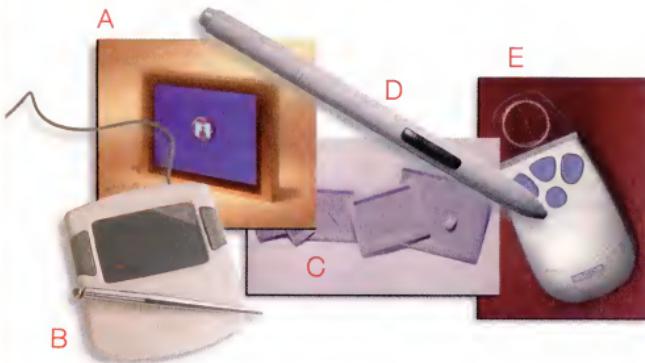
regular mouse. Just slide the pen along the tablet to move the cursor. If you want to click, tap the pen on the tablet, just like tapping your finger on a touch pad. Double-click by tapping the pen on the tablet twice.

Pens are far less expensive than tablets. You should be able to buy a basic pen for around \$30, and a more specialized, high-end pen for approximately \$100.

You also can throw a puck into the mix, if you want to have more control over graphics manipulation. Wacom makes four-button and 16-button pucks for computer-aided design (CAD) and digitized drawings. The puck's buttons are programmable, giving the user more control over functions in the graphics programs. Pucks cost about as much as pens. Wacom's four-button puck sells for around \$40, while its 16-button "control freak" puck sells for about \$200.

It's Your Choice. We've talked a lot about the alternatives to your basic mouse, but that's not to say that mice are bad input devices. They certainly get the job done, and many, such as IBM's ScrollPoint mouse, have additional features that make them worthwhile. But it's worth considering alternatives to mice. Trackballs and touch pads tend to be a little more comfortable than a mouse if you need to do a lot of pointing and clicking each day. And, there are some instances when a mouse is simply not as practical as an alternative device. So, consider the price and your needs and get the right input device for you. ■

by Michael Sweet



A Touch screens are for specific environments where a mouse and keyboard may not be practical, such as in retail or manufacturing. **B** The Cirque PowerCat touch pad is comfortable and includes several cool features, such as the ability to move forward and back between World Wide Web pages. **C** Since graphics tablets come in a variety of sizes and prices, you should be able to find one that perfectly fits your needs. **D** Graphics tablets require a pen. You can choose from many different types, including the pressure sensitive Wacom Erasing UltraPen. **E** If you want even more control over your graphics, you may want to get a puck.

Solutions For New Scanners

Answers To The Most Common Setup Questions

Scanners are one of the hottest PC peripherals on the market. Too bad they're not always so popular once users get them home. Scanner setup headaches are so common that buyers return up to 15% of scanners in some price categories. Problems are more likely during the first few hours of ownership than at any other point in a scanner's life. That's because it can take more than a little fine-tuning to get a scanner up and running for the first time. Fortunately, most of the setup problems are preventable or have an easy solution.

An Ounce Of Prevention. Before you can install a scanner, you must buy a scanner. This is the first and easiest place to prevent problems. Many users buy scanners only to find the devices are incompatible with their PCs. Before you head to the store, get out a piece of paper and write down your system's processor type and speed (for example, 166MHz Pentium with MMX), amount of memory, and amount of free hard drive space available. Note the types and connections of peripherals attached to your computer. Also, determine how many and what type of **expansion slots** (a socket within a PC that allows for the installation of add-on cards) are available within the computer. You may need to contact the computer manufacturer or refer to your user's manual to obtain this information.

Compare your notes to the system requirements and specifications for the scanner you want to buy. Talk to a salesperson or contact the scanner manufacturer to inquire about the best scanner for your system. You might have to add more hardware to your system to support the scanner you want, but don't be talked into buying something you don't need. Go to another retail outlet and get a second opinion



before you start upgrading your PC for a scanner.

Here's a tip: Don't expect too much from the scanner you select. As with any other electronic device, you get what you pay for. Fortunately, scanning technologies have improved so significantly during the last year that it's possible to get a 24-bit flatbed color scanner and robust scanning software for less than \$100. That's more than enough to satisfy most home and small-business users.

For more advanced scanning needs, you'll need a scanner that offers 30-bit scanning and comes bundled with a scanning software suite or high-end scanning software. Typically, these scanners fall in the \$300 range. Beyond that are the industrial strength, professional-quality drum scanners that typically sell for more than \$20,000. Ask several knowledgeable salespeople or users for recommendations on a unit that will meet your needs.

Immediate Installation. Once you have the scanner home, don't postpone the installation. Some retail outlets have limitations on product returns, and you don't want to be stuck with a faulty scanner just because you didn't try it out within the warranty period.

As with other hardware installations, you can prevent many scanner problems by reading the

installation manual completely before opening or plugging anything into the computer. The manual will tell you what to expect from the setup and warn you about potential problems. Taking an extra five minutes to do this may save you hours on the phone with technical support.

Follow the installation manual's instructions exactly. If you encounter any problems or have any questions along the way, contact the manufacturer before proceeding to the next step. Be sure to check the manufacturer's World Wide Web site for answers. The sites often include solutions to the most common problems. After you install the scanner, double-check all the connection points to make sure they're snug and secure. A faulty connection can cause the scanner to fail. Next you need to install the software, **calibrate** the scanner (set it up to properly recognize images), and run the scanner tests as described in the installation manual.

Many users make a mistake during the calibration process, says Paige Mendheim, a technical marketing specialist and former support technician with UMAX Technologies Inc. "When you first power on your scanner it goes through a calibration process," she says. "But a lot of people will put their documents or their pictures on the flatbeds before they power it

on. Sometimes that will cover the calibration strip so the scanner won't calibrate correctly." As a rule, don't put any images or documents on the scanning surface until the scanner is on.

With any luck, the scanner should complete the calibration, pass its scanning tests, and be ready to scan your photos and documents. Give it a mild workout, scanning a few photographs and documents right away. Test all the features, even the ones you think you'll never use. Now is the best time to report any malfunctions and solve any setup problems.

If Problems Strike. Of course, not everyone will have an easy installation. Users with unusual hardware or software configurations are especially likely to encounter setup problems. Run the following easy tests to find and solve most problems.

Missed connections. You should have double-checked your connections already, but if you call technical support, they're going to ask you to do it again. If the connections look tight and secure but your scanner is on the Fritz, unplug each cable connection and then reconnect them. Similarly, remove any expansion cards you added inside your PC and reseat them in the expansion slots.

Check a few other elements before calling technical support. Make sure the scanner is plugged into an electrical source and the scanner's power switch is turned on. Also make sure the scanner is unlocked. All manufacturers lock the scanner chassis before they ship it to minimize the risk of damage. Follow the directions outlined in the installation manual to unlock the scanner. Also, check the indicator light on the front of the scanner for a signal that the scanner is functioning. Generally, the indicator light is solid when the scanner is properly set up. A flashing light could indicate a hardware problem; users should contact the manufacturer if the indicator light does not switch to a solid light.

Incompatibility issues. "The biggest problem that customers have is that they can't get the PC to communicate with the scanner," Mendheim says. These communication problems generally result from an incompatibility between a parallel scanner and another peripheral device that connects to a parallel port. Many computers have only one parallel port, so they connect several devices to it in a *daisy chain* configuration where one device plugs into another, which then plugs into the parallel port.

The easiest way to determine if a conflict is causing your scanner malfunction is to isolate the scanner by disconnecting all other peripheral devices attached to the PC. If the scanner functions properly after disconnecting your printer, external storage devices, digital cameras, and whatever other peripherals are attached to your PC, then you know compatibility is the issue.

Reconnect the devices one at a time to determine which peripheral is incompatible with the scanner. When you have ascertained where the problem lies, it's time to find a solution. Contact the manufacturers of the scanner and

Here come the streaks. Most streaking problems in scanned images result from nothing more than dust on the scanning surface of a flatbed scanner, says Patti Norris, the senior product line manager for UMAX Technologies.

"If they're getting streaking," she says, "the first thing would be to follow the manufacturer's instructions for cleaning the scanning bed." Spray a glass cleaner on a soft cloth, such as the type used for cleaning camera lenses, and wipe the scanning surface until the dust and dirt is gone. Never spray the glass cleaner directly on the scanning surface.

If that doesn't eliminate the streaking, do some more investigating. Vertical streaks sometimes indicate a hardware problem; contact the manufacturer for additional analysis. Horizontal streaks sometimes indicate a problem with transmission noise. Double-check the connections to make sure they're secure and remove any microphones or speakers near the scanner. If that doesn't solve the problem, contact the manufacturer to determine what other steps you should take.

■ Continued Maintenance.

Maintenance for scanners, which have a typical life span of 100,000 scans, is minimal.

Turn the scanner off when it's not in use, says Chris Smith, marketing manager at Commax Technologies Inc. "(Cold cathode) bulbs last approximately 8,000 hours," he says. "If your scanner utilities (software), set your scanner bulb to go off after not using it for 30 minutes." Fluorescent bulbs, sometimes found in older scanners, have a much shorter life span.

Smith also recommends minimizing how often you open the scanner's cover or touch the scanning surface, and you should clean the surface with a soft cloth if you notice smudges or dust. Don't eat or drink around the scanner and never sit on it. Also, position the scanner away from sources of heat or water.

Once it's up and operating, the scanner should perform flawlessly. Theoretically, the installation of other hardware and software could cause a problem with compatibility, but the manufacturer of the newly installed device or program should be able to resolve the situation. Keep any documentation that came with the scanner in a safe place and perform a full backup of your system's data once the PC is functioning properly. ■

by Jeff Dodd

You may find solutions to your scanner setup problems in documents on the manufacturer's World Wide Web site.

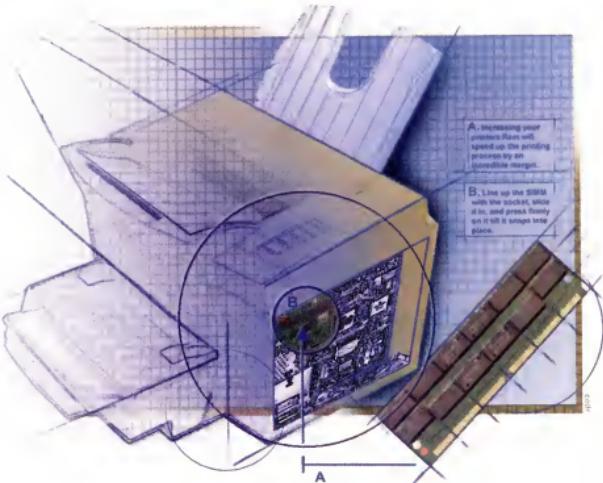
Printer Memory

If you print large documents or share a printer with other users, you've probably found yourself standing by the printer, waiting as it slowly creeks out your document. Sometimes it's so frustrating that you might wonder if it would be easier to use a chisel and stone slab.

None of us likes to wait; we are accustomed to instant gratification. So why do people accept the fact that they have to wait for a printer to squeak out several pages of text and graphics?

An often-used solution for some types of printers is to increase their speed and productivity by giving them a memory boost. When you add memory to a printer, it's able to store more information in its buffer, which leads to faster, more efficient printing. The quality of your print jobs is also likely to improve when you add more memory.

Unfortunately, you can't add memory to every printer. Even if you try to teach your inkjet printer mnemonic devices, you just



Project Overview



Tools

Screwdriver



Time

About 5 minutes



Cost

\$14 to \$100



Benefits

Faster printing, better image quality



Leading Companies

Hewlett-Packard, NEC, Okidata, Lexmark, Epson

can't add memory to an inkjet. It's laser printers or bust. Most of them let you add additional memory, in many cases up to 16 megabytes (MB).

The Catch. There is a catch, however. Many printer manufacturers require you to buy special **memory modules**, which puts you at their mercy when you decide to upgrade the memory of your printer. (A memory module is a card that contains the memory chips, which you install in the printer.) You won't be able to use any other manufacturer's memory.

Some printer manufacturers, such as NEC, make laser printers that will accept 72-pin single in-line memory module (SIMMs), however. These types of memory modules are also used in computers, unlike proprietary memory modules, which can be used only in the particular products for which they are developed. This is a real bonus because you should be able to find 72-pin SIMMs at almost every computer retailer. A second

bonus is that 72-pin SIMMs tend to be cheaper than their proprietary counterparts.

That's not to say any SIMM you buy will work with your printer. As with any memory upgrade, whether it's for a printer, video card, or sound card, there are going to be certain requirements. The documentation that came with your printer should list your printer's requirements. You also can find information on your system's specifications by visiting the manufacturer's World Wide Web site or calling the company. You should watch for requirements such as whether you need parity or non-parity memory or a specific type of memory, such as synchronous, dynamic random-access memory (SDRAM), dynamic, random-access memory (DRAM); or extended data output, random-access memory (EDO RAM). Also note what speed (measured in nanoseconds) of memory you need, such as 80 nanoseconds (ns), 70ns, or 60ns.

SIMM prices vary according to how many megabytes you're buying and the

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specifications of the particular SIMM. SIMMs are available in a variety of sizes, such as 2MB, 4MB, and 16MB. You probably won't need (or even be able to) add more than 16MB of memory to your printer. Typically, a 4MB SIMM costs \$12 to \$20. Proprietary memory modules cost considerably more, possibly as much as \$100.

Performance Gains. In any case, more memory leads to better printing. Scott Howley, laser printer product manager for NEC, says you can expect two types of performance gains. The first is print speed. The paper may not spew out of the printer into a little pile on the ground, but you will definitely have more pages printing faster.

Another type of performance gain is the quality of the print job. Howley says, "If a graphic image is too complex, you may not be able to render the page at 600dpi (dots per inch)... You may fall back to 300dpi." Lower dpi means a lower quality image, something you can easily avoid by adding more memory.

How big of a performance gain one can expect is difficult to measure. We do know, however, that the more megabytes you have, the better. According to Howley, with 6MB of printer memory, you should be able to render any graphic image without falling to a lower dpi. The benefit of adding more than 6MB of memory is the added capacity to buffer more data on the printer. For example, this is good for network printers that need to store multiple jobs.

Get The Job Done. Upgrading printer memory is a simple task for most users (even if you don't have much computer experience). We looked at several brands of laser printers, and found that, although the installation procedures varied widely, several were very similar to the one that follows. Use this article as a general guide rather than the definitive treatise on how to upgrade your printer's memory. Check your manufacturer's instructions on how to insert printer memory for more specific instructions.

The first thing you should do, as with any upgrade, is make sure your computer, and all components attached to your computer, are off. This includes the monitor, an external modem, a scanner, and certainly the printer. You don't want an unexpected shock.

In most cases, you'll have to remove a section of the printer to get at the memory module's installation area. On the printer we tested, we removed the right side of the case, then unscrewed the panel that covered the socket for the memory module. The printer we tested required a common 72-pin SIMM. These are easy to install, but be careful to make sure you line it up properly with its socket. Because the labels on SIMMs and their sockets aren't always good, it can be difficult to determine which way to insert a SIMM.

Many SIMMs, however, will have the number 1 printed next to the first gold pin along the edge of the memory module, and 72 printed along the last pin. Typically, when you insert the pin, the number 1 should be on the left side. You may also see the numbers 1 or 72 listed on the socket, which will help you to properly line up the SIMM. Line up the SIMM with the socket, slide it in, and press firmly on

it until it snaps into place. Once installed, the SIMM should be at a slight angle.

Replacement SIMMs. If you need to replace a SIMM, you need to know how to remove one. The SIMM socket has a couple of small, metal flaps on its sides; these help keep the SIMM locked in place. Press these in, and you should be able to pull out the SIMM without trouble. You may need to do this if, for example, you initially installed a 4MB SIMM and later decide to replace it with an 8MB or 16MB SIMM.

Adding memory to a printer is inexpensive, just as it is with a computer. We recommend upgrading your printer's memory if you have the option. It's easy to do and takes only a few minutes. The productivity gains far outweigh the costs. ■

by Michael Sweet

Terms To Know

buffer—An area in memory in which data is temporarily stored until it is ready to be used.

dots per inch (dpi)—Refers to the number of pixels that constitute a printed image. A pixel is the smallest component of an image. The number of pixels per inch (measured vertically and horizontally) indicates how detailed an image will be. For example, an image printed at 300dpi by 300dpi will not be as detailed as an image printed at 600dpi by 600dpi.

dynamic random-access memory (DRAM)—This particular type of memory has been around for a while and is becoming obsolete. It stores data using a system of transistors and capacitors. DRAM is slower than other types of RAM because it needs to be electrically recharged every millisecond.

extended data output, random-access memory (EDO RAM)—This type of RAM is newer and faster than DRAM and has become very popular over the past couple of years.

megabytes (MB)—A unit of measurement equal to 1,000 kilobytes, or 1,000,000 bytes.

The size of storage media, memory, and programs is usually measured in megabytes.

nanosecond (ns)—One billionth of a second. Speed measurements of single inline memory modules are in nanoseconds, such as 60ns, 70ns, etc.

parity—A method used by single inline memory modules to check for errors in transmission of data. If a problem does not occur, the data goes to the computer. If a discrepancy of some sort occurs, however, the data does not go to the computer and an error message appears.

proprietary—Technology or products developed and copyrighted by a specific company. Often, proprietary technology is not shared or licensed to other companies or the products will only work with other products made by that company. Many printer manufacturers have proprietary memory upgrades.

single in-line memory module (SIMM)—A circuit board to which several memory modules are attached. Used for adding additional memory to computers and printers. □



Worry-Free Charging

'Net Security Systems Make Online Shopping One Of The Safest Places To Use Credit Cards



The Internet has been good to Robert Summers. But perhaps more impressively, it hasn't been bad to him. He is president of RKS Software Inc., an Arlington, Va.-based company that produces productivity and office software. RKS Software has been around for 15 years, but it wasn't until the company set up an online storefront in 1996 that the business went through the roof.

"Our business has quadrupled ever since we've been on the 'Net," Summers says. "It's just incredible. Anybody who's not on the 'Net is missing out on the Internet revolution."

Even more incredible is the fact that in those two years of doing business online, Summers claims he has never had to worry about security. RKS has dodged infamous online threats including credit card fraud and electronic eavesdropping. "It has never been a big issue," he says. "We have never had any problem, and

we have never heard of a problem from anybody else. We have never had any personal experience of any customer ever experiencing a problem with their credit card by ordering over the Internet."

Are RKS Software and its customers an anomaly when it comes to online security? The answer is no. Consumers should understand that credit card fraud is a real danger and that they should protect their credit card numbers as much as possible. But credit card fraud in general is decreasing, thanks to improved security technologies, and there's no reason to become paranoid about using a credit card in a reputable place of business—even if it's online.

Let's Talk Fraud. According to MasterCard, credit card fraud accounted for a mere 7.7 cents of every \$100 of transaction volume in 1997, down from 9 cents for every

\$100 charged in 1996. What may shock some consumers is that the credit card fraud rate for online shopping is assumed to be even lower than that.

There are two primary reasons for the low rate of online credit card fraud. The first and most obvious is that much easier ways exist for a thief to steal a credit card number. Only an expert computer programmer could crack common security measures and steal your credit card number on the Internet. Anyone, on the other hand, can steal your purse, fish your credit card receipt from a restaurant garbage can, or read your card number while you wait in line at the store. If you really want to allay your fear of using a credit card in the virtual world, remember this: Every time you use your credit card in the real world—at the gas station, a restaurant, a department store, or over the telephone—you give your credit card number to a potential thief.



The second reason for low online credit card fraud rates is that online credit card sales volume is still low when compared to overall credit card sales. According to MasterCard, online credit card sales accounted for 1% of all credit card transactions in 1997. That number isn't very tempting to someone who wants fast cash.

Once in a great while, however, online credit card fraud happens. Most people assume that the greatest moment of danger for online shoppers is during the credit card number's transmission from customer to vendor. That's when a hacker intercepts the numbers and quickly maxes out the credit card, right? Wrong. Although this type of fraud is possible, it's unlikely. In fact, you run a greater risk of becoming a victim of Internet credit card fraud long after you've made any purchase—online or offline—says Jeffrey Schiller, co-director of the Security working group at the Internet Engineering Task Force. (IETF is a Reston, Va.-based organization with the purpose of addressing problems that affect the Internet.)

"It is highly unlikely that someone's credit card number will be 'sniffed' [eavesdropped on] during a transaction," Schiller says. "The larger risk is that a merchant's server will be broken into by a hacker and the merchant's database of card numbers stolen."

As we explained earlier, Internet crooks know a lot about computers. Rather than go after a single credit card user who may cough up a \$10,000 or \$15,000 credit limit, why not go after a whole database full of credit card numbers and rake in a thousand times that much? Even a thief wants a little bang for the buck.

■ Security Check. The Internet industry has gone to great lengths to alleviate the fears of concerned consumers. Internet developers and online businesses have initiated a series of safety measures that make it secure to send a credit card number to an online vendor and difficult for thieves to obtain your number from the vendor's computer. These precautions actually make it safer to conduct business online than in person.

Online security can be analyzed as a three-part process of authentication, data encryption, and data integrity.

Authentication. This part of the process verifies the identities of the buyer and seller. Usually, this involves the user providing an ID and a password to the vendor, but the exact process depends on the security protocols (rules for exchanging data on a network) and technologies being used by both parties.

Safe Shopping

Is it safe to shop online? Of course, as long as you shop at secure sites. Here's a sampling of secure shopping sites that offer popular products. Most sites on the Internet, including these, employ the SSL security protocol.

Barnes And Noble (books)
<http://www.barnesandnoble.com>

Lands' End (clothes)
<http://www.landsend.com>

Omaha Steaks (steaks)
<http://www.omahasteaks.com>

Dell Computers (computers)
<http://www.dell.com>

Florists' Transworld Delivery (flowers)
<http://www.ftd.com>

Ticketmaster (tickets)
<http://www.ticketmaster.com>

Godiva Chocolates (candy)
<http://www.godiva.com>

Data encryption. During this part of the process, the data is **encrypted** (converted into a secret code) before transmission. When the data reaches the recipient, it is **decrypted** (converted back into its normal format) so the recipient's computer can read it. Data encryption (sometimes referred to as **cryptography**) is an important part of online security as it protects the data while en route. If the data is intercepted, encryption can prevent hackers from reading it.

There are two basic methods of data encryption: private (or secret) key and public key. Both approaches take place in the background, without the user's input. With private key encryption, the sender's computer encrypts the message according to its own standards. A key for decrypting the message is bundled with the encrypted message, and the entire packet of data is sent to the recipient. The recipient's computer then uses the key to decrypt the message. Because everything is transmitted in one group, private key encryption is fast but less secure than public key encryption.

With **public key** encryption, the sender's computer encrypts the message according to the standards set by the recipient's computer. To do this, the sender's computer must look up the key of encryption used by the recipient, then use that key to encrypt the message. The encrypted message is sent to the recipient, who permanently holds the key for decrypting the message. Because the decryption key never leaves the recipient's computer and because the sender's computer must look up the key of encryption used by the recipient, public key

encryption is slower and more secure than private key encryption.

Data integrity. This part of the process preserves the quality of the data as it is transmitted. The security protocol protects the transmitted data by controlling access to it. If the data is damaged or tampered with on the way to the recipient, the security protocol notifies the recipient.

■ Highest Standards. A number of security standards have made their way onto the Internet, but two have risen above the rest to become common in online transactions.

Secure Sockets Layer. The **Secure Sockets Layer (SSL)** protocol, which was developed by Netscape Communications Corp., has become a de facto security standard for the Internet (see sidebar above for a sampling of some SSL-protected sites). It employs a version of private key encryption to protect data transmitted between two points on the Internet. Typically, the **Universal Resource Locator (URL)**, a Web site's address of a site protected by SSL starts with **https:** instead of **http:**. SSL is used only on the Internet and not for electronic mail (E-mail) communication.

The IETF is working to combine SSL with other major Internet security technologies to create a new protocol, which will be referred to as **Transport Layer Security (TLS)**. Schiller describes the new protocol as a natural evolution of SSL and claims it will be fully compatible with SSL. TLS is on the verge of being issued as a proposed standard of the IETF, which means it is entering the first level of standardization.

Schiller reports that implementers are currently working on code for TLS.

Secure Exchange Transaction. This standard (known as SET), was developed in 1996 by credit card heavyweights MasterCard International and Visa International with a little help from Microsoft, IBM, Netscape, GTE, and other leading technology companies. Although SET has not yet become widely available, MasterCard and Visa are building up public awareness about its existence and laying the groundwork for widespread implementation.

Designed specifically for online transactions, it involves four parties in each transaction: the buyer, the vendor, the bank, and the credit card company. A buyer must use a digital certificate, which is stored as a plug-in to the buyer's Web browser. The digital certificate contains identifying information about the buyer. If the certificate meets the approval of the bank and the credit card company, the vendor is authorized to fulfill the order. (See "How SET Works" for a detailed description of how SET works.)

SET uses the same encryption technology used in SSL and enhances it with several important automated features that minimize other fraud risks. These automated features greatly enhance the security of the online buying process for both the buyer and the vendor.

"For example," explains Alan Glass, senior vice president of electronic commerce for MasterCard International, "the card number itself is shielded from the merchant until after it is automatically authenticated during the normal card authorization process as legitimate. Thus, thieves cannot pose as merchants to collect card numbers." SET prevents the vendor from using the buyer's credit card numbers for fraudulent purposes, as well. And because the vendor doesn't keep the buyer's credit card number in an online database, hackers can't steal the number that way, either.

In a similar way, SET helps the vendor by guaranteeing that the buyer is legitimate and not a thief with a stolen card. If the buyer's digital certificate doesn't check out, the vendor can reject the order instantly. Without SET protection, a vendor runs the risk of fulfilling an order on a stolen card without checking the card with its issuer, in which case the thief makes out with the merchandise and sticks the vendor with a loss.

The biggest hurdle currently holding back SET's implementation is the logistical challenge of distributing verifiable electronic certificates to millions of potential consumers. Nevertheless, look for SET to become the security standard of choice in the upcoming year.

An Ounce Of Prevention. Regardless of which security method is used to protect a site, nothing will eliminate credit card fraud. Fortunately, you can protect yourself with a few preventive measures.

Send credit card numbers only to secure sites. Everybody has heard this warning, but far too many people don't pay attention. It's like the people who think their cordless telephones are just as secure as their corded telephones—until they pick up their cordless phones and hear someone else talking.

Don't become a victim of credit card fraud because you don't believe the hype, says the IETF's Schiller. "Although the risk of a card number being sniffed is low," he says, "a site that doesn't bother to encrypt your credit card during a transaction is likely to be lax from a security standpoint in general and therefore a good target for hackers to break into and steal your card number."

Make the effort to check a site's security measures before you trust it with any sensitive information. If you use the *Netscape Navigator* or *Microsoft Internet Explorer* Web browsers, that's not too difficult. These browsers feature a small security icon that looks like a lock in the lower portion of the browser window. If the lock is open, then the site is unsecured. If the lock is closed, then the site is secure. Note that only portions of some sites are secured. Explorer's lock may be open as you browse an online store's catalog, for example, but it should close when you move to the ordering page. These browsers also feature pop-up messages that explicitly describe the security status of the current site.

If an online storefront offers a product you like but is not secured, look into other purchasing alternatives. Most sites provide a telephone number or street address you can contact to make a purchase. Phone and mail orders may take longer to fulfill than an online order, but they are less risky than an unsecured site.

Some sites provide only an E-mail address as a method of contact. Never send your credit card number in an E-mail message. That is the least secure means of electronic communication. If you must contact the company by E-mail, ask them to send you a phone number or mailing address that you can use to initiate an order. Reputable companies will be happy to comply.

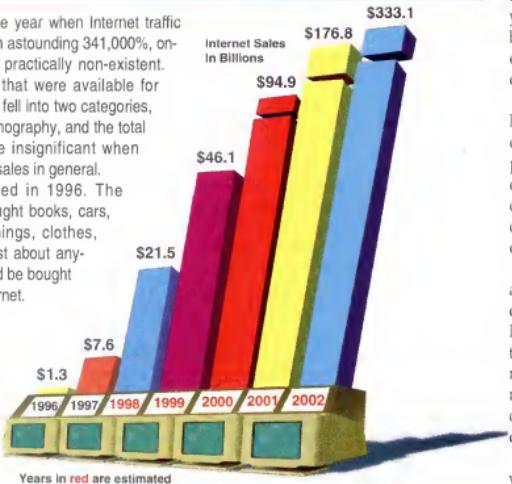
Speaking of reputable companies... Limit your purchases to companies that have a

Online Shopping Spree

Prior to 1995, the year when Internet traffic increased by an astounding 341,000%, online shopping was practically non-existent. The few products that were available for purchase generally fell into two categories, computers and pornography, and the total sales figures were insignificant when compared to retail sales in general.

That all changed in 1996. The Internet boom brought books, cars, household furnishings, clothes, electronics, and just about anything else that could be bought and sold to the Internet.

Based on studies conducted by International Data Corp.



national reputation or that you're familiar with, says Marcus Leech, co-director of the Security working group at the IETF.

"Certainly don't enter into confidential transactions with a site whose identity you're not certain of and whose business practices you don't understand," Leech warns. Think of it this way: You wouldn't buy a Rolex from a back-alley salesperson. Similarly, you shouldn't send your credit card number over the Internet to a business you don't recognize.

The first time you deal with an online vendor you don't recognize, contact the company by phone or in person. Get the name and address of the person with whom you speak in case you run into problems down the road. It's a good idea to contact the Better Business

Bureau (703/276-0100, <http://www.bbb.org>) or the Internet Fraud Watch (800/876-7060, <http://www.fraud.org>) for background information about the vendor, as well. After you established a business relationship with the online vendor, you can take things to the online level.

Along the same lines, don't trust a business just because it has a well-designed site or lists international offices on its site. It's a good idea to doubt everything you see online unless you can confirm it through your own knowledge or through an independent third-party.

Set up an online account. Many online vendors let their frequent customers create online accounts. With these accounts, you provide the online vendor with your credit card information

only once. You then receive a password or user name that lets you log on to the site and make purchases on your account without transmitting your credit card information again.

Of course, you have to be careful about the user name or password that lets you use your account. Anyone who gets that information can make purchases on your credit card. And these companies will store your credit card information in a database that, as we mentioned earlier, could be hacked. But these accounts are a viable purchasing alternative and shouldn't be discounted entirely.

The Real Risk. By following this advice, a user can practically eliminate the possibility of becoming a victim of online fraud. Unfortunately, the same cannot be said for the online vendor. In fact, if there's any real risk in online shopping, it's assumed by the vendors, who must deal with users who try to purchase goods or services with fake or stolen credit cards. Sellers can eliminate the effects of this problem on a case-by-case basis by verifying all credit card numbers with the appropriate credit card issuers before fulfilling an order and by refusing to fulfill any orders made with a credit card number that doesn't exist or has been canceled or reported stolen.

Furthermore, vendors and consumers alike must take the extra steps to protect customer databases from hackers. That means vendors must insist that Internet security measures be a key component of their online storefronts and users must limit their online business to stores offering secure transactions, says Schiller of IETF.

"One of the key overall problems is that people complain about security, but don't consider it important in purchasing decisions," he says. "As a result, vendors don't put a lot of effort into building secure applications. Technologies such as ActiveX (a type of plugins for Web browsers) are a prime example. From a security point of view, ActiveX is a nightmare. Yet people ignore security issues if the resulting product is 'cool.'"

What would really be cool is if Internet shopping could be considered safe for all users at all times. The current state of online security is heading in the right direction. It's up to vendors and consumers alike to see that things continue that way. ■

by Jeff Dodd

How SET Works

It takes about 20 to 30 seconds to complete the Secure Exchange Transaction's (SET) confirmation procedure for each transaction. The following summary shows how much happens during that span.

1. Consumer initiates an online purchase by selecting an item to purchase from the online vendor's product catalog.
2. Consumer completes an order form and selects the credit card account that will be used for payment.
3. Consumer sends a message to the online vendor indicating which credit card is being used for payment.
4. Online vendor responds with a message that contains a pair of digital certificates authenticating the identity of the online vendor and the vendor's bank. They also contain public encryption keys for both institutions.
5. Consumer verifies the information and uses the public keys to send an encrypted order to the online vendor. Along with the order form, consumer transmits a digital certificate verifying consumer's identity and credit card information. (The technical details take place behind the scenes.)
6. Online vendor decrypts the portion of the message that was encrypted with the vendor's public key to determine its authenticity. If the message is authentic, online vendor retains the purchase order information. Online vendor
7. Online vendor decrypts the portion of the message that was encrypted with the vendor's public key to determine its authenticity. If the message is authentic, online vendor retains the purchase order information. Online vendor
8. Online vendor forwards credit card information to the bank.
9. Bank decrypts the credit card information, authenticates the consumer's identity, and forwards the credit card number to card issuer for authorization. This is the same process used with any person-to-person credit card transaction. Credit card company approves or rejects the consumer.
10. Bank receives the authorization response. If approval is granted, the bank forwards the information to the online vendor.
11. Online vendor sends an encrypted authorization notice to consumer, notifying them that the order will be fulfilled. (*NOTE: If the consumer's credit information or identity was rejected, the order is terminated immediately.*)
12. Online vendor fulfills the order and sends the goods to consumer.
13. Consumer receives order and a receipt for the purchase.
14. Online vendor receives payment from credit card company, via the bank, when the order has been fulfilled.
15. Credit card company sends a monthly statement, which includes details of the transaction, to buyer. □



Find It **ONLINE**

Compiled by Jeff Dodd and Joel Strauch

American Bar

Association

<http://www.abanet.org>

The purpose of the American Bar Association (ABA) is to encourage quality legal services, equal access to justice, better understanding of the law, and improvements in the justice system. ABA membership is limited to lawyers, law students, and legal associates, but anyone may visit the organization's World Wide Web site. People trying to learn about lawyers will appreciate the site's educational resources. People looking to find a lawyer will appreciate the lawyer referral directory. And people looking to complain about a lawyer will appreciate the site's directory of lawyer disciplinary agencies.

The Business Law Site

<http://members.aol.com/bmethven/index.html>

All the local, state, and federal regulations that govern industry and business make it tough for small companies to keep current on their legal duties. This site makes it a little easier by addressing business-specific legal concerns. Numerous links point to national and international legal resources, and the site features a number of articles and essays discussing the legal issues that pertain to trademarks and copyrights, raising capital, electronic commerce, and business taxes.

The Consumer Law Page

<http://consumerlawpage.com>

The biggest criminal threat most individuals face isn't murder, rape, or theft. Those won't affect the average person as often as the quiet crime known as consumer fraud. The Consumer Law Page alerts the



site's visitors to the causes, symptoms, and results of this social disease. Visitors can browse articles and brochures covering everything from defective products and toxic chemicals to fraudulent services and medical scams. Free consultations by E-mail and a lawyer referral service are also available.

FindLaw

<http://www.findlaw.com>

Unless you're a member of a law firm, you probably don't have access to the best legal research tools on the Internet. But it only takes an Internet connection to access FindLaw, a legal tool that can satisfy the curiosity of the untrained law buff. Organized like the Yahoo! Internet directory, this site lets users locate information on the Internet by searching for a keyword or phrase or by browsing its 14 directories. The site also features the day's legal headlines and access to public-interest mailing lists.

**Frequently Asked
Bankruptcy Questions**
<http://www.agin.com/bkfaq>

Comedians like to point out America's penchant for paying with plastic. But for an increasing number of people, that joke isn't funny anymore. This list of

questions and answers provides a general overview of bankruptcy law and gently explores the major issues confronting the individuals and businesses who owe more than they can pay.

**Fully Informed Jury
Association (FIJA)**
<http://www.fija.org>

One of the most notable rights we have as U.S. citizens is the right to a trial by a jury of our peers. But that right carries with it the heavy responsibility of acting as an informed juror when the judicial system beckons. FIJA, which is devoted to promoting the rights of American jurors, has built its site to provide information about the power of a jury. Visitors can learn about juror rights, find out the location of national jury rights organizations, and sign up to become a member of the organization.

**Legal
Information Institute**
<http://www.law.cornell.edu>

Insomniacs and legal enthusiasts will enjoy the hypertext collection of legal documentation at this site sponsored by the Legal Information Institute at Cornell University in New York. Recent

and historical Supreme Court decisions, the complete U.S. Code, the U.S. Constitution, the Federal Rules of Evidence, and the Federal Rules of Civil Procedure are complemented by an E-mail directory of the faculty at many U.S. law schools and the American Legal Ethics Library.

The Litigation Site

<http://www>

<http://www.litigationlaw.com>

What America really needs is more litigation, right? Well, a heck of a lot of lawyers must think so because many sites on the Web are dedicated solely to lawsuits, and The Litigation Site has links to most of them. You'll also find a healthy serving of the latest litigation headlines; employment resources, including the National Law Journal Salary Survey that reveals how much lawyers earn; and free legal research tools.

Nolo Press

Self-help Law Center
<http://www.nolo.com>

Before you pay a lawyer to answer your legal questions, visit the Nolo Press Self-help Law Center. This site, produced by a leading publisher of self-help law books, offers more than its share of quality legal advice and information—and it's free. Check out the Current Features, an assortment of essays that examine various areas of the law; the Legal Dictionary, an index of more than 200 clearly explained legal terms; and the Daily Tip, regular hints that can save you time and money. But the real gem here is the Legal Encyclopedia. This collection of in-depth essays and frequently asked questions helps you learn what to expect from a lawyer and the justice system. ■



Try It Online

The World Wide Web is about more than just data; it offers a chance to get involved and interact online. Check here for sites that let you get the most from the Web.

priceline.com

<http://www.priceline.com>

You've heard from friends and co-workers about the possibilities of obtaining some cheap airline tickets from the Web, but comparison shopping can be a lot of work, and the quotes you find aren't always the best ones out there.

One stop that will help you find the best tickets available at prices you're willing to pay is priceline.com. You enter the dates you'd like to fly, your points of departure and arrival, and what you're willing to shell out. After you guarantee your offer with a credit card, priceline.com will automatically buy the appropriate tickets when they become available. (NOTE: The site recommends selecting a price no lower than the lowest advance purchase price for your flight or you may not get the tickets.)



If you're a flexible traveler, let priceline.com find you the best fares in the air.

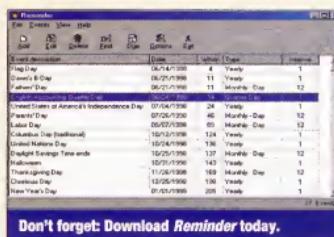
The service has its own database of available flights and searches millions of constantly changing fares to find the right one for you. The service isn't for everyone. You can't choose the time of day you need to fly or select a specific airline. Also, the tickets you buy are non-refundable, non-changeable, and don't earn frequent flyer miles.

Share The Wares

Some of the best apples in the online orchard are the free (or free to try) programs available for download. Each month we'll feature highlights from our pickings.

Reminder. If you're so forgetful you can't even remember where you keep your day planner, try Agenda Computer Solutions' *Reminder*. Every time your computer starts up, *Reminder* will pop up a list of digital strings around your finger, making sure you don't miss a meeting or birthday.

Reminder's grid is easily customizable, letting you add daily, weekly, monthly,



Don't forget: Download *Reminder* today.

Quick Fixes

Most of today's software can always benefit from a few updates, patches, and add-ons downloaded from the Internet. This month we focus on E-mail programs. Note that if you use the default mail reader that comes with your World Wide Web browser, it may have been updated right along with the browser (see our May 1998 Find It Online section for browser update information).

Eudora

Qualcomm has a variety of E-mail readers in its *Eudora* line. For the latest version of *Eudora Light* shareware, visit:

<http://eudora.qualcomm.com/eudoralight.html>

For *Eudora* Pro updates:

http://eudora.qualcomm.com/pro_email/uploads.html

Microsoft Internet Explorer

If you use *Explorer 4.0*, you can update its mail client *Outlook Express* at the Explorer component page (*Internet Mail*, the mail client from earlier versions of Explorer, doesn't have updates available):

<http://www.microsoft.com/ie/download/addon.htm>

Netscape

If you use *Communicator*, visit the *SmartUpdate* site to obtain patches for its components:

http://www.netscape.com/download/software_direct.html

For earlier versions of *Navigator*, visit *Netscape's* archive File Transfer Protocol (FTP) site: <ftp://archive:oldies@archive.etscape.com/archive/index.html>

Pegasus

If you use David Harris' popular shareware *Pegasus Mail*, be sure to upgrade to version 3.01 at: <http://www.pegasus.usa.com>

yearly, or one-time events. This shareware for Windows 3.x and 95, a 400 kilobyte (KB) download available from <http://www.agenda.diron.co.uk>, will run for 30 days before you must register it for \$20.

Yahoo! Pager. Yahoo! Mail users (and those willing to sign up for this free E-mail service) will want the *Yahoo! Pager*. This 710KB freeware program lets you stay in touch with all your online compatriots. Of course, they also need to be Yahoo! Mail users and have the *Yahoo! Pager* software, but once you're both hooked up, the software will alert you when your friends are online and let you send them instant messages.

Yahoo! Pager is available from <http://www.download.com> by searching for the freeware by name. You'll need Windows 95 and at least a 3.0 version of *Navigator* or *Explorer* to use it. ■

The Web's Multimedia Toolbox

It used to be that a World Wide Web browser was all you needed to view most Web pages. But, as more and more Web pages add multimedia, the browser can't always take you where you want to go. Now, there's a cornucopia of multimedia files you can download from the Web—all kinds of graphics, video, and sound files. So, when you download a .RAM or a .MOV file what exactly are you receiving? And what program do you need to open them? Here's a quick guide.

Audio

There's a plethora of sound file formats and a corresponding number of programs and browser plug-ins used to listen to them. Each format compresses and represents sound using different techniques.



Microsoft Internet Explorer, unlike **Netscape Navigator** needs helper programs such as **MediaPlayer** to play sound files.

change File Format (.AIFF). All three can be opened by *Netscape Navigator* or, if you're using *Microsoft Internet Explorer*, Windows 95's (Win95's) *MediaPlayer*. *MediaPlayer* should open automatically when you download a sound. If not, it can be found in the Start menu, Accessories, Multimedia. Windows 3.x users should use *Navigator* or download *Internet Explorer* 4.0 for Windows 3.x, which became available in July.

Regardless of whether you have *Internet Explorer* or *Navigator*, the sounds play automatically and are not saved after they finish playing. If you want to save a file and then play it back later, you'll need to right-click the file and save it to your hard drive. To play it back later, open either *MediaPlayer* or *Navigator*, go to the File menu, select Open or Open File and select the sound file you want.

Video

There are only two video formats, not counting streaming video formats, but both require add-ons to the browser for you to view them. They are QuickTime (.MOV or .QT) and Motion Picture Experts Group (.MPEG or .MPG) movies. For QuickTime movies, you'll need to download the free plug-in from Apple at <http://www.apple.com/quicktime>. With .MPEG movies, there is software packaged with Win95 and 98 (ActiveMovie) that will play the movies. Windows 3.1 users should download Internet Explorer 4.0.



MPEG movies will open in Windows' ActiveMovie, but not in a browser.

Streaming Audio & Video

There are two main formats for streaming audio and video, which are more like broadcast feeds of media than single files playing. Each format requires you to download special software. The two formats are RealVideo/RealAudio (.RAM) and Microsoft's NetShow (.ASX). RealVideo/RealAudio require the



You'll need to download a copy of RealPlayer to take advantage of most streaming audio or video.



RealPlayer program, available for free at <http://www.real.com>. Likewise streaming audio or video in the NetShow format requires Microsoft's *MediaPlayer* 5.2, available for free at <http://www.microsoft.com/windows/mediaplayer>.

Unlike regular audio and video files, streaming audio and video files do not include the entire sound or video clip; they are merely files that tell RealPlayer or MediaPlayer which machine to connect to on the Internet and what data to transmit. Accordingly, they are very small—a NetShow file can be as small as 110 bytes as opposed to the regular sound and movie files, which are usually at least several hundred kilobytes in size and often as large as six to 10 megabytes.

Graphics

For the most part, your browser will get the job done for downloading graphics. Support for the two most common graphics formats found on the Web—Graphics Interchange Format (.GIF) and Joint Photographic Experts Group (JPEG or JPG)—is built into both Navigator and Internet Explorer.

A third format, Portable Network Graphics (.PNG) has been developed to replace .GIF. Like JPEG, it allows for pictures with color depths of millions of colors, but it does not offer the same compression benefits as JPEG. .PNG has yet to catch on, because only the latest versions of Navigator and Internet Explorer show .PNG images without having to use a separate plug-in program. Those using older browsers will need to upgrade to the latest version of Navigator or Internet Explorer or download a plug-in, such as *KeyView* (<http://www.keyview.com>) and *Quick View Plus* (<http://www.inso.com>).

The fourth major graphics format, bit-mapped files (.BMP), is a little more involved. You'll need to download the files to your hard drive and then open them with the Paint or

Paintbrush programs built into Windows. In Win95 and 98, Paint can be found in the Start menu's Accessories folder. In Windows

3.x, you'll find

This image is typical of many others on the Web. It's a JPEG, which means it takes little disk space and can be viewed in the browser without needing special software.



Paintbrush in the Accessories program group. Bit maps offer a better resolution than a .JPEG, but they take much more disk space because they don't compress information like the JPEG format does.

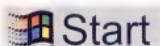


Q&A

Need help with your hardware or software?

Looking for simple explanations on technical subjects?

Send us your questions!



WINDOWS 95

Q: In my \WINDOWS\TEMP directory I see some files ending with .TMP. Can I just right-click them and delete them?

A: It's safe to delete Windows' own temporary files, but not while Windows is open and running. If you do, it's possible the temporary file (particularly if it has today's date on it) is in use by a program. This may cause it to refuse to delete, or worse yet, delete but lock up the program that uses it. Windows will usually (but not always) delete its own temp files when it shuts down. If not, delete them safely and quickly by clicking the Start button, then Shutdown, then Restart In MS-DOS mode. After Windows closes, in the DOS screen, type `del c:\temp` and/or `del c:\windows\temp`. Follow each by pressing the ENTER key.



WINDOWS NT

Q: Like many, my Windows NT is set up using its optional NTFS filing system mainly because it allows long file names. When I tried to use the XCOPY command to copy files that use long file names (more than the old DOS 8+3 size limit) to a second hard drive that's using the ordinary, older FAT (File Allocation Table) filing system, I got the message "The file name, directory name, or volume label syntax is incorrect."

A: The Windows NT NTFS filing system allowed long file names even before Windows 95 (Win95) did so. Win95 (despite allowing long file names) also uses the older FAT filing system so you may get the same message trying to copy to a hard drive occupied by Win95. If you use NT's XCOPY command with the /N switch, XCOPY will understand what you need to do and do it for you without the error message. For example, typing `xcopy budget*.dat d:\financial*.* /n` should do it. However, the file names created during the copy process will, of course, be shortened. Oddly, there seem to be fewer problems copying NT files with long names to ordinary formatted diskettes than to hard drives.



UTILITIES

Q: I found the article "New Hard Drive, Old Data" in the March 1998 issue very useful in moving stuff to my new hard drive, but I was troubled by the sidebar that advised against using XCOPY or COPY or BACKUP to copy my old Windows 3.1 files onto my new Win95 hard drive. I have my old WordPerfect files on diskettes and was going to use COPY to get them into my new Win95 system. What do I do now?

A: You misunderstood. The article didn't say you can't use XCOPY or COPY on Win95. It said you shouldn't use or operate the old *versions* of those utilities that came from an old DOS or Windows 3.1 computer on a Win95 system. The old versions don't understand the long file names that live on the Win95 hard drive and could mess them up. Feel free to use the newer versions of COPY and XCOPY that are on your Win95 system (in the \WINDOWS\COMMAND directory) at a DOS prompt. For that matter you could simply use Win95's Windows Explorer to move files off your diskettes.

Q: We're giving our old 386 with its 40 megabyte (MB) hard drive and DOS 6.2 to my son's school. I want to make sure all my WordPerfect and Quicken files are really gone. If I just delete them, I believe they're still accessible. Would reformatting the hard drive truly get rid of them?

A: When files are simply deleted they're not really deleted immediately (even on systems without Win95's Recycle Bin). They're removed from your disk's FAT but are—at least for the moment—still there, moderately easy for a snoop to recover. Eventually other files write over the old ones. To make that eventually come sooner, you could run a complete defragmentation (with the DEFrag utility) after deleting the directories/folders in question (use DELTREE). That process is about 90% certain to move other files onto the disk area where your files existed, making them unrecoverable.

Another quick way to wipe out everything reasonably completely is to use the FDISK utility to delete the drive

UTILITIES (CONT.)

partition and then make a new partition. Doing that, however, would make the system useless until someone reformatted and re-installed at least DOS.

Reformatting (type **format c/u/s** if you're certain you want to do this) would wipe out everything (particularly using the **/U** switch, which means "unconditionally"), although a *really* skilled and determined user still might be able to find some data on there. Using *Norton Utilities*' WipeDisk feature would completely wipe out residual traces of any files you have erased; run WipeDisk without reformatting.

Q: Your "Win95 Tips, Tricks, & Troubleshooting" Learning Series issue included instructions for creating a batch file and shortcut called *Save.bat*, which backs up various important system files. It works great except it won't copy the important Registry files (*User.dat* and *System.dat*) unless one first manually uses Windows Explorer to get into those Registry files' properties and uncheck/remove the hidden, system, and read-only attributes. Is there a way to automate that in the batch file?

A: Sure. Use Win95's Notepad accessory to edit *Save.bat*, and we'll use the DOS ATTRIB command in that file to automatically do what you want. Your *Save.bat* file should look like the example below. We're adding two ATTRIB command lines before the lines that copy the Registry files:

```
attrib -s -h -r c:\windows\system.dat
attrib -s -h -r c:\windows\user.dat
md c:\backup
copy c:\windows\system.dat c:\backup
copy c:\windows\user.dat c:\backup
```

The 5 means system, H means hidden, R means read-only, and the minus sign in front of each means the PC should remove that attribute. It's probably best to put two lines at the end of the file to set attributes back as they were; do that by using the same two ATTRIB commands *without* the minus signs. Remember, if you ever need to restore the Registry from the backups you made with *Save.bat* you'd need to use the same ATTRIB command before restoring; if not, the read-only attribute would prevent you from copying the good backup copies onto the bad originals.



ONLINE COMMUNICATIONS

Q: I use the Microsoft Internet Explorer World Wide Web browser, and I notice my computer keeps getting these files called cookies when I visit certain Web sites. Can, and should, I remove them?

A: Cookies occur on all browsers, not just Internet Explorer. Web sites place cookies on your computer, which is much less ominous than it sounds. Cookies are small files with some bits of information usually about a password you've set up on a site or, more likely, some preferences you selected when using that site. You can view cookies in Notepad, but it's mostly unreadable stuff. Deleting them usually does no harm, but it frees little hard drive space. With a cookie on your system, the next time you visit the site you don't have to re-enter the same information. If, for example, you revisit a Web bookstore, it might look at your cookies, notice you like books on cats, then pitch you a special offer on cat books. Cookies are stored in the **COOKIES** and the **TEMPORARY INTERNET FILES** folders in your **WINDOWS** directory. Some folks are suspicious that when you visit other sites they may be picking up information about where you've been online from your cookies. But cookie information is probably no more invasive of your privacy than the info the supermarket picks up when you sweep your discount card through the scanner.

You can make Explorer either block all cookies or display a confirmation prompt before downloading any. In Explorer click View, then select Internet Options. Click the Advanced tab and scroll down to a set of option buttons labeled Cookies. Their use is self-explanatory. If you make Explorer prompt you before accepting any cookie you'll see a dialog box each time a site attempts to leave you one. You'll probably get annoyed at having to click "yes" or "no" every time and reset it again to always block or always accept.

Q: I'm running CompuServe's CS3.0.4 software. Recently my Favorite places list disappeared (the box opens but lists nothing). The file *Favorite.dat* still exists in my *CSERVE\SUPPORT* directory. It appears to have at least some of the old contents when I use *EDIT* to view it. What happened, and what can I do?

A: *Favorites.dat* is an older leftover file and isn't the file CS3 actually uses. Your current file of favorite places (that's apparently corrupt) is called *Places.dat*.

If you have a recent backup just restore the file *Places.dat*. If not, close down CS3 and delete *Places.dat*. When you restart CS3, it will create a new *Places.dat* from the old *Favorite.dat*—probably getting at least most of your favorite places back. Remember, this list of favorite places on CompuServe is totally separate from the list in your Web browser.

Q: My business in England has many U.S. customers, and I receive frequent requests to send my product prices through my CompuServe E-mail account. I don't because, although it looks OK when I send it, people say it arrives jumbled.

ONLINE COMMUNICATIONS (CONT.)

I'd like to send it by E-mail because it would save me time and money. I've enclosed in my message to Smart Computing a sample of the price list, not as an attached file but right in the E-mail message. What can I do?

A: Your decision to simplify computer life by cutting and pasting your price list directly into an E-mail message rather than sending it as an E-mail attachment is basically sound. Although attachments often arrive fine, they can add complexity and problems to E-mail, especially when you're sending messages to a wide variety of folks with diverse computers, software, and skills. Your price list arrived in our E-mail only slightly warped.

The only thing wrong with the list you sent us was misaligned columns. We suspect two reasons: First you sent an E-mail message without forcing the typeface to stay in a monospaced mode. We fixed that easily by simply changing the typeface on this end to a monospaced font. In monospaced fonts such as Courier a thin "i" takes the same amount of space as, say, a fat "W." In more typical proportional fonts that's not so, thus spacing between words can vary, and columns don't align vertically.

You could have fixed the problem on your end by pressing the Options button on your CompuServe software and selecting Send Exactly As Shown (preferably before composing the message) instead of the default Reformat Text To Window. Other E-mail software has similar options. Send Exactly As Shown also forces lines to break exactly where you pressed the ENTER key instead of wrapping, unpredictably, to the size of the window in your recipients' E-mail viewers. This often prevents messed up text formats.

Someone using the more common Win95 E-mail software (*Exchange*, also called *Windows Messaging*) rather than CompuServe's software would do this all by starting Exchange, opening the Tools menu, then Options, then the Send tab. There they'd click the Font button. In the resulting dialog box they'd select a monospaced font. There's no sure way to tell any font is monospaced, so we'd suggest Courier or Courier New.

Another source of scrambling problems may be your use of tabs between columns. If, for example, you had your word processor tabs set 10 spaces apart and you cut and pasted text into an E-mail message, the tabs may operate differently in two respects within the E-mail software. When you press TAB in a word processor the cursor jumps to the next tab stop. When you press TAB in some E-mail software the cursor jumps five spaces forward from the last character typed.

We suggest you set up, once and for all, a list formatted just for E-mail. Use a monospaced font. Don't use tabs (use spaces) if editing in a word processor. Always send "exactly as shown." This forces recipients to view your E-mail

in a hideous font, but it should eliminate about 95% of your scrambled list E-mail problems. We can't always pin down causes for the other 5% of cases where E-mail formatting becomes scrambled. In those cases try resending your information as an attachment.

Q: *I'll be visiting Mexico. Will I be able to pick up and send E-mail messages through my America Online (AOL) account while traveling away from home?*

A: Issues are similar for all travelers, whether they use AOL or other providers. Since you're an AOL member, your simplest solution could be finding someone with an AOL account (and AOL software running). (AOL has about 10 dial-in numbers in Mexico—mostly in cities tourists visit.) For any country you can (while still in the United States) seek AOL foreign access numbers by opening the AOL GoTo menu, selecting Keyword, and typing access.

On your host's computer go to Select Screen Name, click the down arrow, and change the sign on name to Guest. Then click Sign On. After it dials up and connects, AOL will ask for your own screen name and password. You'll receive familiar, home-type access. If you're like most U.S. AOL members, you won't pay any online time-charges, but in most countries other than the United States AOL members pay additional per minute connection charges (in Mexico it's 10 cents per minute) billed to your host's account. In some places it's much higher.

A second way to connect from wherever (again, if AOL offers service there) is to use your own AOL software in, say, your portable computer. In that case you'd need to find a foreign AOL dial-in phone number (best done before you leave the States using the process described above), then change your AOL software to a foreign dial-in number. As a last resort if there was no foreign dial-in number you could tell your AOL software to dial back to a local number in the States. You might run up an enormous phone bill, unless you log on for a minute or two to download your E-mail messages and read and reply to it after disconnecting.

If you're somewhere in the United States that lacks a local AOL dial-in you can use the toll-free, dial-in numbers (888) 245-0113 or (800) 716-0023, but AOL adds 10 cents per minute to your bill.

Another E-mail alternative while traveling is to get a free Web-based E-mail account. Visit either <http://www.hotmail.com> or <http://www.yahoo.com> and set up an account called, for example, Alex@hotmail.com and a private password. You then could send and receive E-mail messages from that Web page. The advantage to this is you can access your E-mail messages from any computer with a Web browser and Internet access. You wouldn't even need to take a computer with you. One downside is you'd have E-mail in your normal E-mail account and at Hotmail. Another

ONLINE COMMUNICATIONS (CONT.)

problem is that navigating Web-based E-mail systems is often cumbersome compared to regular E-mail software. Other ways are available to access your E-mail service provider from a computer connected to the 'Net through a provider other than your own, but most are rather complex. For more conventional E-mail (not AOL or CompuServe) it's often possible to forward your E-mail messages to another E-mail address you'll access from the road.

**WORD PROCESSING**

Q: In Q&A you once mentioned changing the .DOC file's association so that Microsoft Word doesn't automatically open up the .DOC files. You said that this provided some protection against macro viruses. How does it protect, and exactly how do I change the association?

A: Macro viruses work by using macro ability (ability of a program to automate tasks)—including the task of deleting files. The Windows WordPad accessory can open and even edit Word files, but has no macro abilities, thus is not susceptible. If .DOC files aren't automatically opened by the vulnerable Word program, you should avoid macro viruses. Here's a quick way of changing a file's association:

- Use Windows Explorer or Find to locate any file ending with .DOC.
- Click it once to highlight it.
- Hold down the SHIFT key and while holding it right-click on the file.

That should pop up a menu which offers the choice called Open With. Select that choice. The Open With dialog box should list many programs you could open that file with. Scroll down until you find WordPad. Before selecting WordPad, be sure to click the box that says "Always use this program to open this type of file."

Then highlight WordPad and click OK.

Q: I'm using Word to lay out some invitation cards consisting of two facing, 7-inch tall and 5-inch wide pages. Of course, I'm using landscape (sideways) printing to put them next to each other. I can't buy 7- by 10-inch paper, and my printer has no feeder mark for 7 by 10 paper anyway. So I tried lying to Word and telling it the printer has 7 by 10 paper, figuring I'd trim the margins off later, then fold down the middle. But no matter what, I can't get it to print in the correct position. The more I try to adjust the paper size and the margin size, the worse it gets.

A: What a tangled web we weave when first we practice to deceive—even when lying to a word

processor about paper size. It gets confusing indeed because various printers place your smaller imaginary sheet on various positions on the bigger paper. Throw in the additional factor of requiring some margins on your text, and it gets bewildering.

You'll usually have better and less confusing control of the printed material's position on the page if you're honest with the word processor about the paper (telling it you have 8.5 by 11 paper there) and use extra large margins to force the material to the position you want on the page. For your case, let's say you want to position your 7 by 10 imaginary smaller sheet in the upper-left corner of an 8.5 by 11 page and you want the finished/cut printed material to have half-inch margins. Set the upper and left margin to a half-inch. Set the bottom and right to a half-inch too, but don't stop there. To end up with a 7- by 10-inch sheet area you must remove *extra* cutting space on the bottom and right side—1 inch off the bottom to cut an 11-inch piece of paper down to 10 inches and 1.5 inches on the right to bring the 8.5 inch paper down to 7 inches. So expand the bottom and right margins by that amount more than the half-inch you need for the white space/real margin. Provided your 8.5 by 11 paper has been previously aligning properly, that should do it regardless of what printer you use.

UPDATES

In the August column a reader asked about issues involved with plugging his three-prong computer power cord plug into the two-prong, ungrounded electrical plugs in his older house. We suggested that although his computer would run without a ground, it was important to get a ground installed by an electrician; we also suggested the possibility of a homemade ground. One of our electrician readers reminded us that it's difficult to make a ground correctly, and that a poorly done ground can, in rare cases, create a fire hazard. We'd like to suggest, instead, that if you don't have a ground you buy and install a ground fault interrupter (available in most hardware stores for about \$10). Unlike a ground, it won't protect your case components from some risk of static damage, but it will protect against electric shock hazards otherwise present in ungrounded equipment and would comply with most electrical codes. ■

Get straight answers to your technical questions. Ask Smart Computing! Send your questions, along with a phone and/or fax number so we can call you if necessary, to: Smart Computing Q&A, P.O. Box 85380, Lincoln, NE 68501. Please include all version numbers for the software about which you're inquiring, operating system information, and any relevant information about your system. (Volume prohibits individual replies.)

FAQs

This new addition to our popular Q&A column covers the questions we frequently hear, but you may be too shy to ask. Frequently asked questions (FAQs) are a popular service for bringing new users up to speed quickly on the Internet and in computer help files. Check here each month for straight answers on questions every user asks at some point.

This month's FAQs cover one of the hottest input devices going: scanners.

What is TWAIN?

TWAIN is an acronym for Technology (or Toolkit) Without An Interesting Name. The name may not be interesting, but the technology certainly is. TWAIN is a special device driver that lets TWAIN-compatible software automatically activate your scanner. Most scanners and scanner software incorporate TWAIN, ensuring that devices should work in most environments.

What's the difference between flatbed and sheetfed scanners?

Flatbed scanners, the larger of the two types, are more popular than sheetfed scanners. Flatbed scanners operate similarly to a photocopier, incorporating a glass plate on which you place the paper you wish to scan. When you close the lid and activate the scanner, a scanning head moves beneath the document and transports an image of the document into your computer. Flatbed units, which tend to cost more than sheetfed, can scan objects of bulky or unusual shapes, such as books or oversized documents.

The smaller sheetfed scanners are a good choice if you want your scanner to be close at hand, but don't want to sacrifice desk space. Users feed one page at a time into the scanner. Images from sheetfed scanners usually aren't quite as good as images from flatbed scanners.

What does DPI mean?

DPI stands for dots per inch and is measured horizontally and vertically. For example, if a scanner has 300 x 300dpi, the scanned image will consist of 300 dots per inch both horizontally and vertically, for a grand total of 90,000 dots. The higher the number of dots per inch, the higher the image quality because more dots can squeeze into a smaller space. This creates a more defined, detailed image.

What's the difference between a SCSI and parallel port scanner?

SCSI stands for Small Computer System Interface, a popular kind of port found on many PCs. These ports, which come in types such as Fast SCSI and Ultra SCSI, transfer data more quickly than parallel ports (a port you can plug printers and several other types of devices into). Parallel ports transfer data at a little over one megabit of data per second, while Fast SCSI can transfer up to 10 megabits per second. You should be able to scan images faster using a SCSI scanner and port.

Parallel port scanners are easier to set up because you don't deal with issues such as terminating

devices on the SCSI bus or reconfiguring your SCSI controller card. Some people prefer to avoid the technological gymnastics involved in working with SCSI devices and buy a parallel port scanner.

Another good alternative to both SCSI and parallel scanners are **Universal Serial Bus (USB)** scanners. These scanners combine the best of both worlds—high performance without the installation headaches. USB ports are on all new PCs, and USB scanners and other peripherals should be commonplace in the future. The release of Windows 98, which takes advantage of USB far better than Windows 95, should hasten the growth of the USB device market.

What is OCR?

OCR (optical character recognition) is software used with scanners to import text documents into a computer. When you scan a text document into a computer, the document saves as an image. You can't edit the text because the PC doesn't recognize the individual letters that make up the text. OCR software transforms the image into a text document, so you can edit the text like you would any text document originally composed in a word processor.

Is there a difference between optical resolution and interpolated resolution?

Yes. Optical resolution measures the individual pixels (picture elements, or individual dots that make up a computer image) that the scanner can measure. Scanners with interpolated resolution, on the other hand, improvise by creating additional pixels between the ones that already exist. The scanner will try to guess what the additional pixels should look like, based on the existing pixels. This often results in a poorer quality scan, so try to avoid interpolated resolution scanners.

What is bit depth, and should I buy a scanner with a specific color depth?

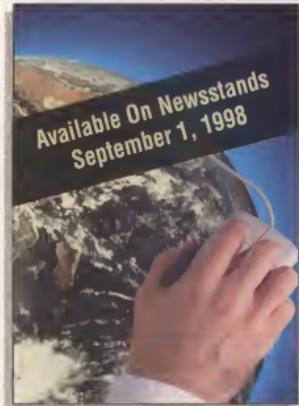
A scanner's bit depth (or color depth) refers to the number of colors a scanner displays. This reference is exactly the same as for monitors. There are several degrees of bit depth: a 4-bit depth equals 16 colors, 8-bit equals 256 colors, and 24-bit equals approximately 16.7 million colors (24-bit is also referred to as True Color). Most scanners are 24-bit, although some display color in 30- or 36-bit depth, which provides the highest-quality images. Not all graphics programs (or monitors), however, can take advantage of the high bit depths. If you work with high-end graphics, the higher bit depth will be worth it, otherwise, a 24-bit scanner should meet your needs. ■

Look For These Upcoming Titles From

PCNOVICE

&

Smart Computing
IN PLAIN ENGLISH

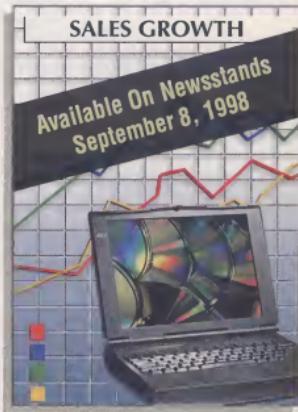


Internet Basics

This issue walks you step-by-step through your first online connection and gives you detailed tutorials on many Internet activities. Includes software and hardware tips.

Powerful Presentations

Find out how to create impressive presentations using your PC. Filled with tutorials, tips, and technical advice.



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ACTION



EDITOR

When Ralph Nader can't be reached, bring your computer service problems to our Action Editor column. This page will help you find products, resolve service problems, and keep manufacturers alert to the critical issue of customer relations.

Are you having trouble finding a product or obtaining adequate service from a manufacturer? If so, we want to help solve your problem. Send us a description of the product you're seeking or the problem you had with customer service. In billing disputes, include relevant information (such as account numbers or screen names for online services) and photocopies of checks. Include your phone number in case we need to contact you. Letters may be edited for length and clarity; volume prohibits individual reply. Write to:

Action Editor
P.O. Box 85380
Lincoln, NE 68501-5380
or
Send E-mail to editor@
smartcomputing.com
or
Fax us at (402) 479-2104

Dear Action Editor,

Where can I find the software to use in Microsoft Word for producing all the alphabets used in Europe as well as the letters and symbols for Classical Greek? Also, how do I use my keyboard, or modify it, to accommodate the symbols and signs not presently available on the standard keyboards?

Miladin Petar Ljubicic
Mission Viejo, CA

You don't need additional software to produce European languages; you need additional fonts. A company called Linguist's Software has more than 350 languages, including TransRoman and Classical Greek. Each of these two packages is \$99.95 plus shipping and handling charges.

Linguist's language packages come with a keyboard layout to ensure you know which keys to stroke; you don't have to modify your keyboard. Its packages are available for Macintosh and IBM platforms.

You can contact Linguist's Software at (425) 775-1130 or look them up on the World Wide Web at <http://www.linguistsoftware.com>.

Dear Action Editor,

I have a Philips Velo 1 handheld computer and would like to use E-mail. I'm a pilot and travel a lot, so I don't normally stick to one location. Is there a free or low-cost E-mail service available for this Windows CE machine? I don't need access to the Internet, but I do want a service that has a toll-free number or numerous access numbers I can dial into.

Paul Bernzweig
San Francisco, CA

With the Philips Velo 1 (<http://www.velo.philips.com>), you are bound by a significant constraint: You can't use an E-mail service that uses proprietary software, such as America Online, CompuServe, or Juno, the popular free E-mail service.

That leaves you to work with a wide array of Internet service providers (ISPs) that provide accounts that work with common E-mail software used in the Windows CE operating system on the Velo. These ISPs usually charge around \$20 a month for their service. A company such as AT&T WorldNet (<http://www.att.com/worldnet>, 408/941-4000, 800/967-5363) or

EarthLink (<http://help.earthlink.net>, 800/395-8410, 818/296-2400) would be ideal since these companies have local access around the country and an 800 number.

If you really want a free service, you could use Hotmail (<http://www.hotmail.com>, 408/222-7000), but you must go on the Web to send and receive mail since the E-mail software is part of Hotmail's Web page. In the end, you may be better off using a traditional ISP. For further information on the Velo 1, call (888) 275-8356.

• • • • •

Dear Action Editor,

I am writing to you about Simply Tax, a program you recently discussed in an issue of Smart Computing. I had a friend look at the company's Web site for ordering instructions. I was shocked when I ordered it and discovered that it required a Pentium processor.

I went through the magazine the Simply Tax people sent, but I couldn't find a customer service phone number or address. This sounds like a pretty shady operation.

Can you find an address or phone number so I can return it?

Also, you should have mentioned in your review that Simply Tax requires a Pentium processor. It would have saved me time and trouble.

C.M. Green
Hutchinson, Kansas

Simply Tax isn't a shady operation, but it doesn't have the best customer service either. Deaver Brown, who publishes the *Simply Tax* magazine, believes the *Simply Tax* customers should do enough homework to know what they want and need before they buy the \$10 *Simply Tax* program.

Unfortunately, not all his customers are that way, especially when they don't receive the program in a timely manner. That's what happened to Harold E. Albert of Anderson, S.C. We asked *Simply Tax* to return his money, but after a series of E-mail messages and several months, he still hasn't received a refund. Just where the breakdown between Albert and *Simply Tax* occurred is tough to know. Brown says Albert never sent his address, while Albert says he sent the required information, including the unopened program, but never received his money.

In any event, for a *Simply Tax* refund, try this address: CD Titles, 1770 Mass Ave., #298, Cambridge, MA 02140 or call (781) 642-1700 or (617) 642-1700. ■



GLOSSARY

Of Terms

Autoexec.bat—The abbreviated form of automatically executed batch file. In the DOS operating system, batch files list DOS commands to be performed sequentially whenever the batch file is run.

BASIC—Beginner's All-purpose Symbolic Instruction Code, a programming language using common words so as to be easily understandable.

benchmark—To test aspects of computer hardware or software against a known standard. Benchmarks are only useful if all computers or applications being tested are tested under the exact same conditions.

bit—Short for binary digit, the smallest unit of computer storage. A bit is a single digit in a binary number, either 1 or 0, often called "on" or "off."

bulletin board system (BBS)—An online computer system you access through your modem that acts as a central source of information. Bulletin board systems are usually geared toward particular interests.

Common Business-Oriented Language (COBOL)—A high-level programming language developed in the 1950s and 1960s. COBOL is popular for business applications designed to run on large computers. COBOL's wordiness makes its programs lengthy, but that offers the advantage of explaining the programs in detail.

computer-aided design (CAD)—The use of computers to design various engineering, architectural, and industrial objects.

cross hairs—A set of crossed lines that takes the place of the cursor in some programs. An operation will take place at the point of the intersection.

cryptography—The discipline of encoding and decoding information.

decryption—The process of translating encrypted data back into its original language.

encrypt—The act of encoding a file for the purpose of preventing others from gaining access to its contents.

high resolution—A term that refers to monitors or printers that produce high-quality output because they generate more dots per inch (dpi).

Information Technology (IT)—A general term used to describe any technology that helps to produce, manipulate, store, communicate, or disseminate information.

infrared—A band of electromagnetic waves slightly below the frequency of visible light. Infrared beams often are used for remote control devices and data transmission. The remote device, such as a remote control, sends an infrared beam of light to a receiving device, such as a television or a computer.

lower resolution—A computer screen or printed page that appears rough, with very little fine detail. Low resolution on a display is the result of too few pixels; low resolution on the printed page is the result of too few dots per inch.

mailing list—Discussion groups that use E-mail messages to link a group of people together with common interests.

nickel-metal hydride (NiMH) battery—A rechargeable battery used primarily in portable computers. These batteries do not suffer from the "memory loss" problem of nickel-cadmium batteries and can store more power.

optical character recognition (OCR)—The process in which the images of letters, entered into a computer with a scanner, are translated into characters that are worked with in the computer as text, not as an image. OCR is far from perfect, but it is the fastest way of digitizing typed pages of text.

paper feed—The method or system by which paper moves through a printer.

password—A set of secret characters or words needed to gain access to a computer or to files and programs within the system.

print quality—The overall quality of a printer's output, based on resolution and clarity of the characters printed. A number of factors can affect the print quality, including the type of printer and the mode setting of that printer.

programmer—A person who writes the codes that make up a program. A programmer may write an entire program alone or with a team or programmers. Another part of a programmer's duties is debugging the program and getting rid of any glitches the program may contain.

resolution—The amount of definition and clarity in an image on a monitor or from a printer. In monitors, resolution is measured by the number of pixels per square inch the device can display. In printers, resolution is measured in dots per square inch that can be printed on paper.

search engine—A program that lets users locate specified information from a database or mass of data. Search engine sites such as AltaVista (<http://www.altavista.com>) are extremely popular on the World Wide Web.

stylus—A pen-shaped instrument used with graphics tablets or touch screen input devices to write or draw on the computer screen as if on a sheet of paper.

Technology Without An Interesting Name (TWAIN)—A standard interface for scanning equipment. Most scanners come with a TWAIN driver, which lets scanners work with any software that supports TWAIN. These drivers often let graphics programs automatically activate a scanner or other input device.

touch screen—A type of monitor with a sensitive panel directly on the screen that registers the touch of a finger as input.

K.I.S.S.

The Smart Approach Is To "Keep It Simple, Stupid"

Clip art and fancy fonts don't kill communication. People do. Sure, it starts innocently enough. Somebody gets a fancy set of graphics or fonts and starts experimenting. But before you know it, they become brazen and start showing off. In no time the thrill ride comes crashing down in a wreck of lost meaning and obtuse page design.

From tame word processing users to trendy World Wide Web page designers, all of us need to take a deep breath and tone it down. Self-control and simplicity are often-forgotten virtues in a computing world overflowing with capabilities and options. Some industry insiders are putting us to shame on this one.

We average folk are armed with processing power that would make an Eisenhower-era nuclear engineer drool, but for our sake and that of anyone who has to look at the information we produce, we should still strive to keep the message simple. Just remember you don't have to show everything you know every time the chance arises. Windows 95 Desktop shortcuts and Web browser bookmarks are classic areas where users make it hard on themselves. Like preset buttons on a car stereo, these features help you jump quickly to your favorite files, programs, and Web sites. But when your Desktop boasts 25 shortcuts and your browser has bookmarks to half the sites you've ever visited, convenience gets lost in a numbing flood of choices. What percentage of those shortcuts and bookmarks have you used in the last month? If the figure is more than 25%, consider yourself an anomaly. Ask the same question about all the buttons you put on customized toolbars in your software. All these are good places to start simplifying.

When it's time to share your work with others, less is more. A glimpse of your ideas draws more interest than the authoritative anthology. Every communications consultant worth their seminar fees suggests sending E-mail messages with clear subject lines and body text that gets straight to the point. Colored text, cute fonts, and lots of smiley faces might

get a client to pass notes to you in study hall, but not entrust you with the big account. Take a moment to check out your use of art, too. One presentation slide, 17 pieces of clip art. Enough said?

PC product manufacturers, normally easier to mock than a "Dilbert" manager, bought into the gospel of simplicity before most of us end users. Direct PC vendors Dell and Gateway let buyers configure every system feature, right down to the type of power supply. But they also have complete PC packages available for one-stop shopping, making the selection process as simple or complex as the user chooses.

Many software makers have found a happy medium between simple and too many details. They've learned that providing user manuals the size of a Denny's menu and putting everything else in realms of on-screen help is almost as frustrating as the thick phone book manuals of yesteryear. The latest smart solution is often a two-volume set that includes a quick-start manual with enough reading to get users working in a hurry and a hefty manual for detailed reference.

Even the Web, where many old-timers actually revel in confusing newbies, is getting downright user-friendly. The Ask Jeeves search engine (<http://www.askjeeves.com>) lets users drop clumsy search phrases and type a question such as, "What is Switzerland's GDP?" Netscape's next browser, *Communicator 4.5*, will let users type the name of a company and then transport them to related sites. Dare we look for the

day when something such as "<http://www.metronet.com/users/2588.htm>" becomes "Old Masters Gallery"? We can, right along with friendlier faces on operating systems. The operating systems of the future are likely to abandon the artificial environment of program groups and folders for on-screen Desktops similar to the real-world version (with approaches hopefully better than the past's cartoonish efforts). In other words, skills learned for real life will translate to the PC screen. Kids bumping around the room will be gathering the skills to operate PCs. It's simple. It's smart. It's the kind of straightforward approach we all can learn from. ■



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